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Contemporary Elderly Housing in China and Europe: Architecture Refurbishing and Emotional Design

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Dorctoral Thesis

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Abstract

This thesis is written under the background of Chinese society. Architecture always develops with adaption to the desires of society. Design is a way to satisfy these social desires. Currently, China is suffering from the aging problems, both of growing aging population and living space quality. Aging problems are calling for more life supports and cares in living space, ensuring the elderly to have a better and healthier life. In addition, China is experiencing big revolutions of architecture. Architecture design is changing the focus from economic factors to humanistic-concerns. Contemporary space is not only a physical object to use, but also a place to experience. In contemporary elderly housing, apart from physical care, emotional care is expected to provide places where the elderly could live safely and happily. Based on series studies of Chinese social situations and problems, this thesis tries to put forward refurbishing and emotional design as new development directions for Chinese contemporary elderly housing adapted to Chinese society.

Comparative methodology is applied between Europe and China. European experiences of emotional design in elderly housing refurbishing are studied in both theoretical and practical fields. In the study process, phenomenology are applied as a philosophical way to analyze the relations among human's perception, emotion and space and to find the nature and meanings of architecture spaces, providing evidence to show the importance of emotional design for the Chinese elderly as well as the society. Emotional design theories of Norman are analyzed to find how to make effective involvements from different levels between objects and human's emotions, providing basic methodology for emotional design in elderly housing.

Apart from these basic studies, specific researches on methodology of emotional design in Chinese contemporary elderly housing refurbishing are realized. Heidegger's thoughts are analyzed to find the core emotional requirements of living space. Living space originates from human's desire of dwelling. It is a place that presents the own identities of a community, a place where the elderly could

feel safe and free. Based on this concept, Norman's emotional design approach is applied in architecture field as a guiding methodology to investigate all the possible ways to create effective interactions between the elderly's emotion and architecture. Corresponding to three emotional involvement levels of visceral, behavior and reflective, architecture could make emotional affect from appearance, functions, and reflections of culture, art and personal value. Related European cases are studied from these three aspects to find the possible ways to realize emotional design in elderly housing, which could provide suggestions to Chinese contemporary elderly housing refurbishing.

For Chinese cases, inheriting Chinese cultural identities is particularly discussed. Chinese culture affects a lot Chinese life styles, their perceptions and understanding of the reality. Inheritance of culture generates great and positive emotional resonance for the Chinese elderly. Emotional design and refurbishment in Chinese contemporary elderly housing should be realized with respect to the culture identities. By analyzing the essence of Chinese culture and contemporary architecture cases of Wang Shu, this thesis is making an effort to find architectural ways to inherit, develop and integrate the essence of Chinese culture in our present time.

Key words: China, contemporary, elderly housing, aging in place, refurbishing, emotional design, culture identities

Resumen

La tesis está escrita bajo la sociedad china. La arquitectura siempre se desarrolla adaptada a los deseos de la sociedad. El diseño es una forma de expresar y satisfacer los deseos sociales. Hoy en día, China está sufriendo problemas de envejecimiento, tanto por la población como por las cualidades del espacio. Los problemas de envejecimiento exigen más apoyo y cuidados en el espacio vital, lo que garantiza que los ancianos tengan una vida mejor y más saludable. Además, China está pasando grandes revoluciones en su arquitectura. El enfoque arquitectónico ha cambiado pasando de los factores económicos a las preocupaciones humanísticas. El espacio contemporáneo no es solo un objeto físico para usar, sino también un lugar para sentir. Además de los cuidados físicos, la gente mayor está esperando un espacio con más cuidados emocionales donde puedan vivir segura y feliz. Basada en los estudios de problemas y situaciones sociales de China, esta tesis intenta presentar el diseño emocional y rehabilitación como nuevas direcciones de desarrollar las viviendas contemporáneas para gente mayor adaptadas a la sociedad china.

Se aplica una metodología comparativa entre Europa y China. Las experiencias europeas de diseño emocional en la rehabilitación de viviendas para gente mayor se estudian tanto en teórica como prácticamente. En este proceso, se aplica la fenomenología como forma de filosofía para analizar las relaciones entre la percepción humana, la emoción y el espacio, así como también para descubrir la naturaleza y el significado de ese espacio, ofreciendo evidencia para mostrar la importancia del diseño emocional para la gente mayor, así como para la sociedad china. Con objeto de investigar la interacción entre los objetos y las emociones humanas, se analice principalmente a las teorías sobre diseño emocional de Donald Norman; se implementa así una metodología básica aplicable al diseño emocional de las viviendas para gente mayor.

A partir de estos estudios básicos, se realiza unas investigaciones específicas sobre la metodología del diseño emocional en la rehabilitación de viviendas contemporáneas para gente mayor en China. A partir de los análisis del

pensamiento de Heidegger, encontramos cuáles son los requisitos emocionales básicos del espacio vital. El espacio vital se origina en el deseo humano de alojar. Es un lugar que presenta las identidades propias de una comunidad, donde los ancianos pueden sentirse seguros y libres. Basada en este concepto, la idea de Norman se aplica al campo arquitectónico como una metodología de guía para investigar todas las maneras posibles de crear interacciones efectivas entre la arquitectura y la emoción de la gente mayor. Correspondiendo a tres niveles de visceral, conductivo y reflexivo, la arquitectura generará efectos emocionales desde su apariencia, funciones y sus reflejos de la cultura, el arte y los propios valores personales. Los ejemplos europeos relacionados se estudian a partir de estos tres aspectos para encontrar posibles métodos de realización de diseños emocionales en viviendas para gente mayor, lo que podría ofrecer sugerencias para China.

En el estudio de los casos chinos, se considerará especialmente la incidencia de la tradición cultural de China. La cultura china afecta los estilos de vida y su forma específica de percepción y comprensión de la realidad. La correcta utilización e integración de las alusiones a la cultura tradicional en el diseño contemporáneo generará grandes y positivas respuestas emocionales en los ancianos chinos. El diseño emocional y la rehabilitación en viviendas contemporáneas para gente mayor deben realizarse con respecto a las identidades culturales. Con los análisis de la esencia de la cultura china y la arquitectura de WangShu, intenta encontrar formas y metodologías arquitectónicas capaces de integrar y desarrollar la esencia de la cultura tradicional china en la época contemporánea.

Palabras clave: contemporánea, China, vivienda para gente mayor, envejecimiento en el lugar, rehabilitación, diseño emocional, identidades culturales.

“The relationship between man and space is none other than dwelling, strictly thought and spoken.” “Dwelling is not primarily inhabiting but taking care of and creating that space within which something comes into its own and flourishes.”

----Martin Heidegger

Chapter 1

Introduction

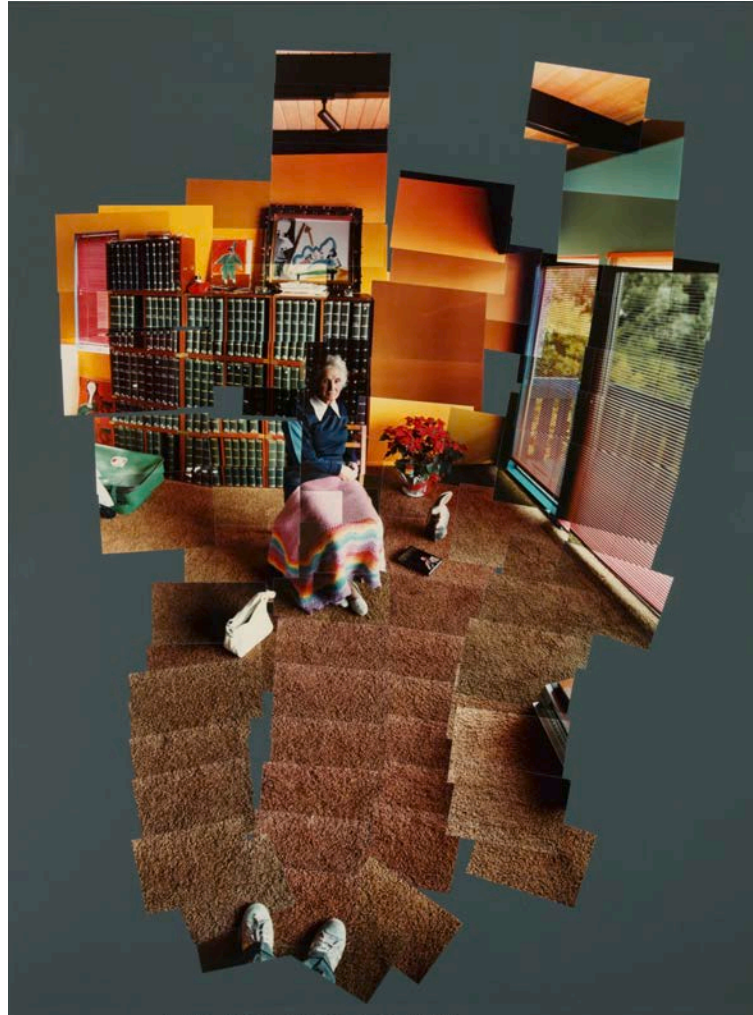


Figure 1.1: Mother, Los Angeles, December 1982. David Hockney. With photo-collage, Hockney showed his old mother's dwelling style interacted with space. (Source: High art museum. Exhibited at Wieland Pavilion, Lower Level, Gallery 101.)

It seems that we are frequently too eager to abandon people and things that no longer seem to have any useful purpose. Aged people and aged buildings are both real and symbolic elements of a past age, the preservation of which is vital to our social continuity and stability. The juxtaposition of elderly housing with various mixed-use functions in an intracity environment would provide the community at large with the opportunity to observe the life style of a group of independent well-elderly people in a congregate housing situation."

----- James J. Beaudoin

1. Background and significance of the research

Getting old shouldn't be treated as a bad thing. In the usual thought, people always treat the elderly as a less useful group. They are disable to make so much value to society as those young people. But aged people, like the old building, have carried the memories, experience and history of the society. And sometimes, they have represented and inherited the social culture and tradition. They deserve the respect and care of the society.

By direct and frequent interactions, elderly housing is a unique place that keeps memories, experience and emotions of the elderly, showing the images of the dwelling styles and life hopes of elderly group to the world. Elderly housing provides possibilities to make the society see and understand the life identities and values of elderly group. Compared with other ages, the elderly are thought as a group which needs more respect to their life styles as well as more humanistic care on their requirements. Elderly housing design should be always treated as a way to satisfy the requirements of elderly's dwelling activities, both in physical and mental. It couldn't be treated as a simple object to live, but a place where the elderly could feel the care and respect of the society, where they could live safely, happily and comfortably with their own life identities.

Elderly housing studies have been started since several decades when the world faced the press of the aging problems. These years, aging problem appears more seriously. Due to modern medico-social development, the ageing of the population is an ongoing phenomenon in both developed and developing countries (Batljan, 2007, p. 15)¹. The proportion of people aged 65 years and older is increasing worldwide by 10 million per year (Batljan, 2007, p. 15). At the same time, the fertility rate is decreasing. The traditional pyramid-like shape of

¹ Batljan Lija, 2007. *Demographics and Future Needs for Public Long Term Care and Services Among the Elderly in Sweden: The Need for Planning*. US-AB Print Center, Stockholm 2007. ISBN: 978-91-7155-428-4

the population structure, with a broad base consisting of young people, has been turned upside down. Other structures with a bulging middle exist. The increasing aging population is calling for more environmental supports and care services to ensure their daily life. The pressure forced the development of elderly housing study. Elderly housing should find new contexts adapted to contemporary requirements of both society and elderly group. On the one hand, architecture with a higher degree of variability and satisfactions to the specific environmental needs is required in terms of the provision of the adaption to both the physic and psychological characteristic for elderly group. And on the other hand, architecture should provide sufficient supports by improving its pattern as well as space qualities to make sure that the elderly could live more helpfully, in order to reduce the social service system pressure of aging problems.

Currently, aging problem is more obvious in China. According to the data released by the Chinese National Statistics Bureau of the National Economic and Social Development Statistics Bulletin of 2014, the total population of 65-year-old and above was 137.55 million. It accounts for 10.1% of the total population, having passed the United Nations standards, 7%, which shows China has already entered an aging society. Moreover, it is estimated that by 2050, the number of elderly people aged 60 and over in China will be about 440 million, accounting for about one third of the total population.

Facing to this growing tendency, the aging society has put forward new requirements and pressure on the architecture system in China. However, the elderly housing design in China is still staying at a low level, both the development pattern and space qualities. This problem mainly relates to the special social developing situations of China.

Architecture is always thought as a product of the society, which is affected by the development of human and their society (Lefebvre, 1991). During the last decades, due to the big desire of economic development, Chinese society had to put their focus of architecture on utility and economic benefits, ignoring the spiritual contexts of space. Chinese architecture and urban totally renewed their

images with strong characteristics of economy and little considerations on inheritance of essential identities.

However, in the contemporary era, big revolutions on architecture thoughts happen in China. Chinese architecture is changing its focus from economic factors to space qualities. Space qualities depend on as well as affect feelings and experiences of the users. Chinese society no longer wants a space that the users have to use, but one they like to use. How to create spaces with good qualities is the main problem for the contemporary architect. Due to this change, humanistic and user-concerned concepts are gradually occupying more important positions in Chinese architecture. Architects come back to study the elements that could create emotional touches, as art, memories, aesthetics, culture, and tradition, with the purpose of creating a more meaningful, comfortable, artistic and cultural space to enrich space experience and improve their feelings. Architecture is no longer treated as a simple industry object to use, but a place to feel, to experience and to satisfy their desires both in physical and mental. Chinese architecture as well as urban renovations are looking for its way to adapt to social needs, especially in mental.

This revolution also happens in Chinese contemporary elderly housing. Chinese elderly housing situations in bad levels couldn't meet the contemporary process of Chinese society any more. Today in China, most elderly are still living in places without well considerations on their true needs. Although Chinese society has already started to attach importance to elderly housing by developing new residence areas for the elderly in big cities, it is not enough either to reduce the pressure of aging problems or to provide suitable contemporary spaces associated with the elderly people's desires. Most Chinese elderly couldn't live in new residence areas both due to the special culture of family value and economic factors. Elderly community as well as the whole society are still suffering from the bad developing situations of elderly housing, both space qualities and living patterns. Elderly housing needs new development to meet the requirements of both the social and the elderly.

With this revolution, solving Chinese aging problem doesn't mean simply providing new residence with effective functions and service for the elderly any more. Suitable aging patterns with introductions of humanistic and emotional satisfactions in spaces are the main exploration for future Chinese elderly housing. The elderly need a place where they could live with respects to their original life identities as well as having rich spiritual enjoyments including culture, history, aesthetics and personal value.

As an obligation of both Chinese social contemporary process and elderly community, Chinese contemporary architects need to find new directions and methods to improve the elderly housing situations. European experience could be learnt and transformed to help to find architectural ways adapted to Chinese requirements. On the one hand, as realized in European developed countries, aging in place and architecture refurbishing, instead of new residence areas, should be explored as a possible solution for Chinese problems. On the other hand, instead of forms and functions, Chinese society needs to pay more attentions to the true requirements of the elderly, especially in emotional aspects, in order to provide a more meaningful and humanistic space adapted to their life identities and spiritual needs. More than a space to stay safely and comfortably, Chinese contemporary elderly housing should also be thought as a place with high emotional experience where elderly can live happily and enjoy their colorful life interacted with society: They receive and feel the social care and respect, as well as share and spread their own identities of memories, culture and experience to the society, making the society to see the special value of elderly community through their living space.

2. Research objectives

Elderly housing has been developing and renewing in both the concepts and the design disciplines while the contemporary process of the society. Contemporary elderly housing needs suitable patterns and new contexts to provide the elderly a better life, both physical and mental. Based on this background, this research hopes to show the essential meanings of elderly living space in Chinese society, making efforts to find effective solutions both of development directions and methodology to solve Chinese aging problems, especially in the respect of emotional creations and architectural refurbishing which are considered as main and possible ways adapted to the needs of Chinese contemporary architecture process as well as elderly community.

Elderly housing, as a special branch of architecture, has its presence through the positive interactions with the elderly. Architecture is not a simple object. It is more interdisciplinary, related to philosophy, arts, technology, culture, tradition, history...etc. Functions and forms are basic things of architecture, but not the only things. Contemporary architecture creates not only an object to use, but also a place that could communicate with people. Contemporary architecture is not an aggregation of materials. Architecture space is alive and could interact with people's emotion to make people see and feel the immaterial connotations like culture, art concept, and emotion that the architects want to show to the public. It's the essential contents of the contemporary architecture. In China, both for the big revolutions of architecture as well as aging pressures, contemporary elderly housing has to provide positive interactions with the elderly in physical aspects as good functions, utility and convenience, also in mental aspects as rich experience and satisfactions of culture, aesthetics, arts, memories and personal value. How to create living space for the Chinese elderly with contemporary meanings and complete satisfactions is the main question of this research.

Focusing on this main question, this research will be realized by several processes

with objectives in detail. Firstly, this research will make a deep analysis of Chinese aging situations as aging patterns, design situations and special requirements of contemporary living space and elderly community, in order to find all the Chinese problems in architectural perspective. Secondly, the research aims to find the developing directions of Chinese elderly housing, linked to Chinese social situations and requirements. On this part, this research will try to analyze the necessities and possibilities of architecture refurbishing linked with aging in place pattern, which is considered as a possible developing direction of future Chinese elderly housing. Emotional design will be also explored both of its significance and importance as a new design focus for Chinese elderly housing. Thirdly, this research will continue to find detailed methods based on the developing directions and Chinese problems, aiming at putting forward new design disciplines and methodology for future elderly housing in China. European cases both in theory and practice will be analyzed in depth with intentions of helping to find contemporary design methods for Chinese architecture elderly housing, especially in refurbishing process and emotional expression.

In the process, specific Chinese culture identity will be another focus of this research. Although the Chinese and European elderly have some common requirements of their living space, the difference of culture, history, aesthetics, traditions, and understandings of life would affect a lot environmental contexts. This research will concentrate on Chinese characteristics, to see the special requirements of the elderly with Chinese identities. How to transform European elderly housing experience adapted to Chinese society and inherit Chinese culture identities in elderly housing will be deeply discussed in this research.

3. Research methods

This research will concentrate on the new developing directions and design methodology of Chinese contemporary elderly housing, especially in emotional design and architecture refurbishing. In study process, methods of survey, comparison, analysis and interdisciplinary study will mainly be used to get a result of the topic.

Firstly, the method of survey will be used in this thesis to see the developing situations of elderly housing in China and Europe, including aging tendency, policies, current living patterns and design statues. The aims of the survey are to find main problems of the elderly housing in China, which help to know how to improve the elderly housing design in future. Surveys will also be applied to see the contemporary requirements of Chinese contemporary society and elderly community. The survey will concentrate on the emotional factors to look for the new feature and requirements of the contemporary elderly housing. There could be a difference of the elderly men's needs between China and Europe, which will affect the elderly housing design. This thesis will try to conclude the different needs of the Chinese and European elderly and their influence on the elderly housing design.

Secondly, comparison is one of the main methods used in the thesis. The comparison will be used in different parts to analyze the different requirements of elderly housing of China and Europe. As said before, there are many things which may affect the elderly housing design. Different cultures, environments, traditions, histories, ages, and experiences all will affect elderly housing design. Through the comparison between China and Europe, it will be clear to see the special characteristics of Chinese elderly housing. Besides the difference, the comparison also helps to find the common things between China and Europe, which tells how to use the European experience of elderly housing design in China. vertical comparison will be also used to know the transform of the elderly

housing in its design concept and design method while the development of contemporary architecture.

Analysis of both theories and practical cases will be realized to see the former experience related to this research. In theoretical parts, deep analysis of architectural phenomenology theories will be realized to see the true meaning and the nature of architecture space, in order to provide evidence for the explorations of the necessities of emotional design and true requirements of contemporary elderly housing. Emotional theories will be also analyzed to find all the possible involvements with emotional system, supporting the realizations of methodology exploration process. In practical parts, emotional design cases as well as elderly housing design cases will be both studied to find possible methods in Chinese contemporary elderly housing, especially in emotional expression and refurbishing process. Particular analysis on Chinese culture identities will also be realized to explore the importance and inheriting methods in Chinese contemporary elderly housing

Architecture is a subject related a lot to other subjects as arts, philosophy, literature and technology. The interdisciplinary study is a necessary way to find the fundamental concept and design methods of contemporary elderly housing. In China, architecture design always involves other subjects. The Chinese traditional painting is used to create a poetic space feeling. Moreover, the philosophy thoughts as Daoism has always been seen in the landscape or interior space in traditional architecture. As a continuo of this concept, interdisciplinary studies in the elderly housing helps to find those possible ways to create emotional involvements depending on the elderly's needs. Art, including the visual art and the sound art is a direct way that may interact with people's mind. And as the development of the technology, architecture has more possibilities in all the parts. The technology can give people a more convenient and comfortable life. This advantage is more obvious and important in elderly housing to give the elderly a better space experience.

For these, the thesis will involve an interdisciplinary study mainly from the

aspects of arts and technology to analyze the design methods of improving the space quality interacted with the emotional feeling and experience of the elderly.

Chapter 2

Development Situations of Contemporary Elderly House in China and Europe

1. Main aging patterns

The concept of elderly housing was first put forward in North Europe at 1970's. Till now, there are mainly two living patterns of elderly housing depending on the living space: Home and Nursing house. The two living patterns are always associated with the physic and psychological situation, economy and family situation of the elderly: home with accessible design for those who can help themselves on the basic life care or whose family can help to take care of them; Nursing house residential care homes for those who need the life care.

1.1. Aging in place

The elderly habitat creates an emotional bond with the surrounding environment (Hurtig et al., 1981; Malmberg & Henning, 2002; Rowles, 1993)². For the elderly, home is the place that they are most familiar to. This type of a maintained living within the ordinary stock of housing represents a case of ageing in place. In this

² Reference from doctoral thesis of Jonas E Andersson. Jonas E Andresson, 2011. Architecture and Ageing, Doctoral thesis in Architecture, KTH Engineering Sciences, Stockholm, Sweden, 2011.

case, the ageing always has a great sense of home and family. They always don't like the elderly residential dormitories, which make them feel being separated with their family. In this pattern, the family plays a very important role to caring the old people. The interaction with family effectively avoids old people's bad mood of being lonely.

In this pattern, the main space for the elderly is home. The design quality of the home space is connected with the living quality of the elderly. And the public space and public service also play important roles in this pattern. Besides home, the surrounding public space of their residence area is the main space for the elderly. It gives the elderly a place to communicate with each other, to take activities and to get basic health care and other services.

Home space and surrounding public space together form the living pattern of the elderly. It gives the elderly a more free and private space. The space contexts are more complex and richer which could help to keep the interest and passion of life. Moreover, living home makes the elderly feel safe and effectively reduces the lonely sense.

This pattern helps to keep the independent ability and environment of old people. Many old people wouldn't like to say that they were old. And they would like to live in their own home, the familiar environment, to show that they have the same living abilities as normal people. They can live, communicate and attend activities as normal, which also helps to put them in a positive attitude.

Aging at home is the most economical way for elderly people compared with the nursing house. However, the ordinary house of flat has a problem that it always lacks necessary accessible facilities and available public space. Sometimes, the elderly could not have enough care or convenience, especially for those who don't have enough family members to take care of them in their basic life. In this case, the architecture space should work better to help them in the basic life. Actually, the architecture has already changed in the past years to solve this problem as well as meeting the needs of living home of old people, both in the architecture design thought and the design norm.

1.1.1. Transformation of aging in place in Europe

In Europe, especially Northern Europe, where the elderly housing has already entered into a mature stage and a high design level, the architecture regulations has been completed with the development of elderly housing. In 1975, when the government of Sweden noticed the aging of the population, and started to adjust the architecture. In 1975, the government of Sweden changed its architecture design regulations, requiring new living constructions to be equipped with accessible facilities. It was the beginning. In the next two years, the accessible design became an enforced rule of architecture. The same case could be seen in other European countries.

The transformation of architecture regulations has also brought the change of the architecture design idea. The following form shows the transformation of the public residence in Occident countries. Early time, in a public residence area, the elderly housing only occupied a little percent compared with normal housing. Most dwellings were not equipped with accessible facilities which only be thought for whom need help in their life. However, today, in many countries in Northern Europe like Sweden, the accessible requirements for the elderly are not only a design regulation, but also a basic thought of architect in their design for the public residence project.

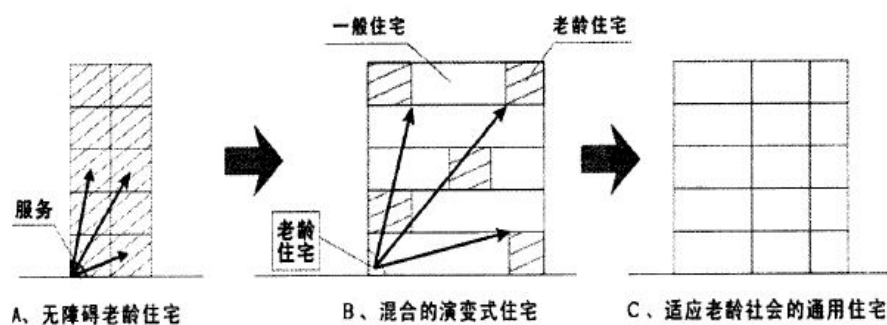


Figure 2.1: The transformation of design thought of elderly home. (Source: Yanmin Zhou, 2011. The dwelling for the elderly, China Building Industry Press.)

1.1.2. Current aging in place models in China

In 2007, Chinese government determined aging at home as the main pattern of elderly housing. Chinese government has put forward a model of aging pattern of “9073”. That is, 90% elderly will be aging at home. Families will give the main support for the elderly and social institutions will provide appropriate assistance and medical services when necessary. 7% of the elderly can buy daily care service from their communities. Communities could provide a long-term service for these people to meet their basic needs. 3% of the elderly will be aging at nurse home.³ This policy meets the economic state of China. Different from Europe, China is a developing country with a big population. Governments haven’t been able to provide a perfect social public care service system for the elderly. Aging at nursing home would bring big economic pressure to most families. Besides, because of special cultural characteristics, the Chinese elderly always have strong family values. Most of the Chinese elderly still would like to live at their own home rather than aging at nursing house. These make aging at home the main pattern for the Chinese elderly.

In the last 10 years after putting forward this policy, current aging situations confirmed that aging at home is the main pattern for China. Wu Yushao, vice president of Chinese Aging Association, said in his report in the forum for aging industry of Tsinghua University in 2017, that now China is forming a “9802” aging model instead of “9073”. 98% of the elderly live at home and only 2% live in nursing home. Community daily care service doesn’t work effectively. Communities sometimes could provide medic or care service for the elderly but couldn’t totally take the place of families’ care. Elderly housing, as the most basic and important aging element for the elderly, should be developed to adapt to this social situation. It requires Chinese elderly housing to be designed with a higher quality both in the developing pattern and space creation.

Chinese architects have already begun their attempts of future elderly housing. Home for the elderly is new a design concept in many cities, especially those big cities, like Beijing and Shanghai. More and more new constructed residence areas

³ ZHOU, Yanmin. CHENG, Xiaoqing. LIN, Juying and Lin, Jingyi (2011). *Housing for the elderly*. China Architecture & Building Press.

have accessible flat for the elderly and their family. In these residence areas, families' care and community service have been combined to provide a better aging at home condition.

New Residence Area for the elderly

Beijing Suncity Residence Area

The Beijing Suncity is one of the first residence areas with a concept of elderly housing. It has been designed for the elderly who want to live home with their families. This big residence areas provide different flat types with a surface from 40 m² to 300 m² for different families. The elderly can choose to live with their family in one big flat or to be neighbors with their family.

The Suncity residence area is located in the north of Beijing. For providing a better living environment and also for the crowded city centre status, the site beside a natural golf park almost 30km from the city centre of Beijing is chosen as the residence area.

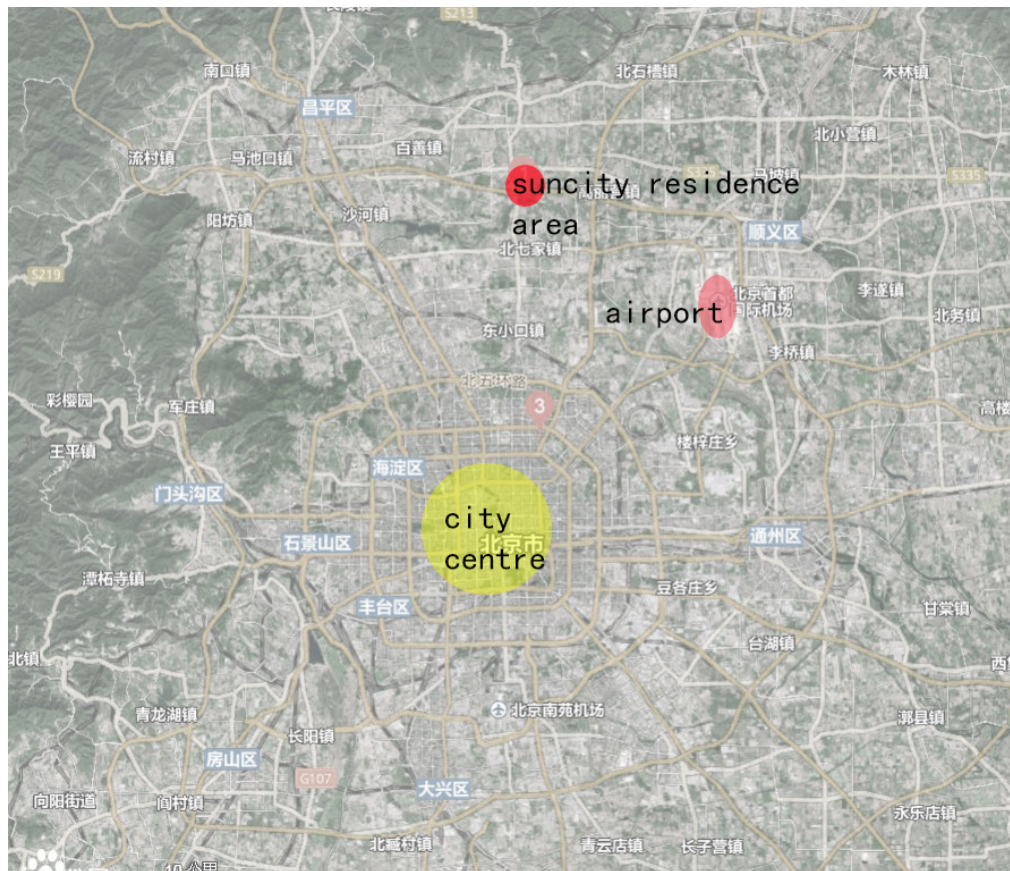


Figure 2.2: Project site. (Source: google maps)

This residence area attaches importance to the creation of natural environment. The floor-area ratio is only 0.3, which makes every building surrounded by the nature. The nature is an element which can help people to relax, and to create a more comfortable living environments for the old people. In traditional Chinese architecture, connecting with nature is always a basic and important design concept of architecture, especially in the living space. The traditional Chinese garden is a representative example of this concept. Different architecture space has been accompanied by different natural elements. In this project, this concept is used.

Connecting to the natural golf park, the architects intend to create a more natural space in the residence area. Different green elements are combined to create landscapes with different scales and styles, which give the elderly a chance to enjoy the rich natural park during their daily life, both in their home and in the public space. The near river has been brought to the area for different waterscapes. There are small walking roads passing the natural area to connect those squares in different scales, which make the elderly have options to walk, stay or do activities in the natural public space.

The main roads for cars are separated from those walking roads for not troubling the elderly and creating a safer public space.



Figure 2.3: Master plan of the Suncity residence area (Source: “Investigation Report of the Beijing Suncity. elderly residence area”)

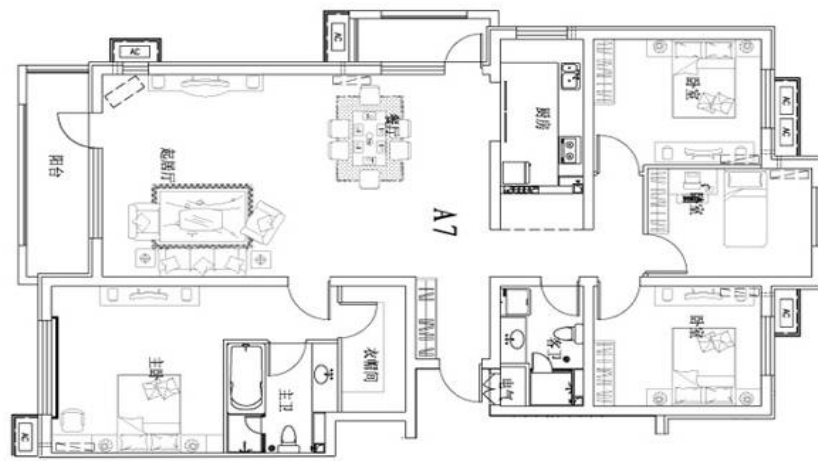


Figure 2.4: Natural space of the Suncity residence area. (Source: “Investigation Report of the Beijing Suncity. elderly residence area”)

The flat design is considered to allow the elderly to live with their families. As said before, living with families will make the elderly feel safer and warmer in their heart. Especially the Chinese elderly have a strong value of family. They like to live together with their families. However, some old people would like to live close to their family but not in the same flat to have more private and free space. For that, there are various types of flats with different surfaces and forms for different families. Families could choose big flat or independent house to live together or some small flats to have a private space.



Figure 2.5: Independent house for big families. (Source: “Investigation Report of the Beijing Suncity elderly residence area”)



此户型为标准层户型（三、四、五层）
首层有阳光房 二层有露台

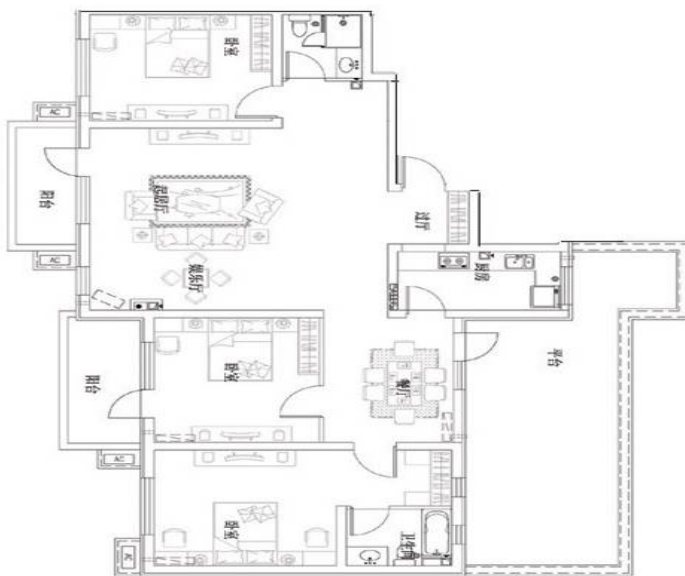


Figure 2.6: Flat with three or four dormitories for the elderly living with their sons and grandsons. (Source: “Investigation Report of the Beijing Suncity elderly residence area”)

There is also a special house with a yard. It is a model from the traditional house type of Beijing, Siheyuan. It is not only to create a more comfortable and natural living space, but a heritage of the traditional culture which evokes the childhood memories of their traditional home for the Beijing elderly.

In the interior space, accessible design has been fully considered. The circulation of the interior space has been simplified to make sure that the elderly could come easier to the public space from their dormitories. Accessible facilities have been installed in the kitchen and bathroom to give a safe living environment to the elderly. More sunshine could enter from the big windows and terrace, which provides a brighter and warmer home space. All these could effectively improve the quality of space to give the elderly a better feeling.

What's more, in the area, other functions and living facilities have also been designed accompanied to the residence, including the hospital, living service, education and entertainment. The elderly can easily find shopping place, restaurant, home cleaning service, and school or get emergency medical treatment. It makes sure the living quality and enrich their daily life.



Figure 2.7: Living facilities: hospital, post office, shopping mall, nursing home. (Source: Qiu Qin, 2010. "The Design for Urban house on Aging in Place", Hunan University.)

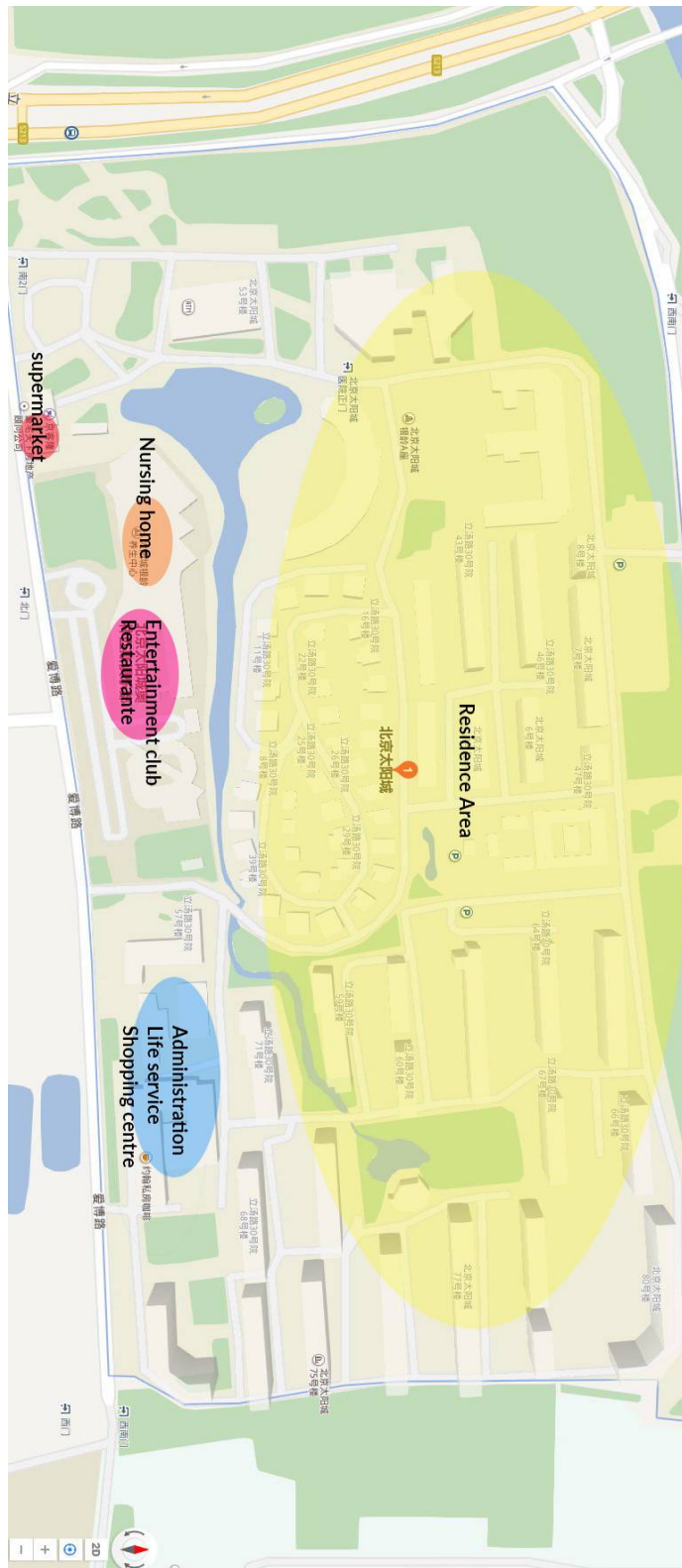


Figure 2.8: Function distribution analysis. (Source: drawn by the author)

However, this living model still has many problems. Firstly, the design for the elderly stays in a basic level. Not every part has been fully thought. This disadvantage is especially showed in the architecture form design. The architecture form is important to create a general image and an atmosphere of the whole area. It gives the first impression of the architecture, which directly affects their interest of the architecture. Good architecture form could reflect the local culture and arts, which helps improve the whole architecture quality interacted with the elderly men's emotion. In the Suncity residence area, the most architecture forms intend to copy the modern form of Europe while in some parts the traditional Chinese form is used. This form couldn't give the elderly a strong impression of either Chinese culture or contemporary feeling. The architect wants to combine Chinese culture with contemporary architecture concept. But it is a lack of design. The copied forms make people boring and out of date.

Secondly, there is a lack of atmosphere in the general space. In the exterior public space, the natural elements have been put without artistic thoughts or concept. The elderly couldn't have enough emotion interaction and communication with the public space. In many places, there is just a simple green space without an artistic or poetic atmosphere. As said before, the contemporary architecture space value does not only mean the function, but also its spirit meaning.

Home refurbishing for aging at home in China

New constructed residence area is just beginning in China and mainly in big cities. It always situates out of the city center with a better nature environment. And the price is always high for normal people, which constitutes a big limit for the elderly to choose this residence. Now, the most Chinese elderly still prefer to live in their original home situated in the city towns. Here they could have a more familiar, convenient and economic living space.

In China, there is not a mature policy or design system for architecture refurbishing for ordinary flats. Without refurbishing, their ordinary flats which always lack necessary accessible facilities or available public space would make them have negative mood of being unsafe, boring and difficult, especially for those who live alone in a ordinary flat. In the future, how to complete the

architecture refurbishing for aging in place is an important term for the development of elderly housing in China.

1.2. Nursing and retirement home

Nursing home is another main living pattern. It is mainly for those who have lost their ability to take care of their basic life or who don't have enough care in their family. Nursing home provides a more professional care service that may give them a better physic care and living environment. Many elderly people enter special housing communities because of a need to change both their home environment and their pattern of living. The need to leave their current home to another home may be due to physical, social or economic changes. A room in nursing home is usually equipped with enough accessible facilities for the elderly, which makes them feel safe and comfortable. And various available public spaces give them a chance to communicate with other elderly people and participate in the different activities, which help remove their boring and worthless mood. But there is still a problem: nursing home is designed like hospitals which is a lack of home sense, that is, makes people feel cold.

1.2.1. The development of nursing home in Europe

In Europe, the nursing home has passed some revolutions during these decades to find a healthy form for both the elderly men's body and mind. The nursing home in Europe has changed from big scale space to small scale and finally combined with the residence area to make sure the elderly could have connection with their family and the society. Europe is the earliest region in the world to face the ageing problem. Since the Second World War, aging problem had been obvious in Europe. Facing to this situation, European governments had formulated a series of welfare measures and built a lot of large-scale nursing homes to solve the problems of elderly people's food, shelter, and medical care. These big nursing homes had a centralized management, which effectively solved the physical

problems of elderly people. The elderly didn't have to worry about their daily life. But on the other hand, it still brought out another problem. This centralized management had weakened the connection between the elderly and the family and society. Old people often felt lonely, resulting in an unhealthy mental condition.

The Japanese writer Nakane Chie had recorded the problem and the negative effects of such large-scale nursing home at that time in her reportage *Civilization of Sweden*.

"...they can survive more than anything in the material age. The elderly in a country are all living in a comfortable life. This is indeed very beautiful. In our view, this is an ideal society. Our traditional family pension is almost disintegrating, and our country has a large number of old people who are miserable and poor in old age. But I see after such an astonishing social security, I wondered if this practice was good or bad for the elderly. The old people passing through the corridor and their empty gray eyes made me deeply uneasy. They are eyes I have never seen before. But when you think about it, you understand: They do nothing but live. What is the meaning of such a life?"

Due to the over-management of these large-scale nursing homes, those elderly who still had the abilities to help themselves are eager to return to society in order to get rid of the emotional confusion created by social isolation. In this situation, government of Sweden proposed in 1956 that the elderly should come back to the communities, advocating that the elderly should communicate more with children, youth, and adults, and promoting the establishment of small-scale nursing homes in residential areas. Till now, this concept has been accepted by most European countries. The large-scale nursing homes have been replaced gradually by these small ones.

Characteristics of currently nursing homes in Europe

Nursing home has different levels depending on the abilities of the elderly, from the normal nursing home to the elderly hospital. The form shows the average scales of the currently nursing homes in Europe. It can be seen that the small

nursing homes with a capacity of 50 to 250 beds are most popular in Europe. It reflects the result of the transform of the European nursing home.

In a nursing home, the elderly has been divided into groups. Every group forms a care-units with 30 persons. Every care-unit is configured with quantitative staffs and facilities. This model contributes to a high work efficiency to make sure every person has enough care.

Public space is another important characteristic of the nursing home. Now Europe countries are attaching more importance to the mental health while paying attention to the physical health. In the contemporary nursing home, the various public spaces are necessary to provide the elderly opportunities to take different activities, to communicate with each other...etc. The architects have made effort to create a rich space where the elderly could do something rather than only living.

Nursing homes have a similar model and system in different European countries. But they still have their own characteristics on aging patterns as well as design details related to social conditions and cultural contexts.

The development of nursing home in Europe has gave some inspiration to China. As can be seen from the above form, although the overall ageing trends of European countries are similar, they have developed rich and varied types of nursing home and provided different services depending on the different characteristics of their society and culture. China couldn't copy the same nursing home model due to the big difference in culture context. Even different parts of China change a lot. The contemporary nursing home should root in the local culture and society. China could study from the European experience and transform the advantage to adapt to the local needs.

1.2.2. Situations of nursing home in China

The nursing home in China can be divided into two main types: public nursing home and private nursing home. The public nursing home mainly provides social welfare for those who don't have enough economic abilities or without families.

It provides the basic physical care and public activities for the elderly. However, it is not enough. Most public nursing homes in China are without design. The emotional needs of the elderly are always ignored. Some spaces even lack accessible facilities. The elderly in the public nursing home are just living without the emotional satisfaction, which easily generates negative moods affecting a lot the elderly people's health,

The private nursing home has more possibilities. These private nursing homes always have good facilities and health care services, also high price. Some luxury private nursing homes are designed as a five-star hotel, intending to create a more comfortable and luxury space for the elderly. Some high-price nursing homes have provided a rich and various public space, as cinema, KTV, dance room, sport center, tea room, theater, mahjong Room and so on.

However, it still has its problem. The high price is the first problem. Normal people are very difficult to have the economic condition for aging in this private nursing home. At present, many private nursing homes always choose the site 30 to 50 km from the city in order to have a good environment. This makes the elderly be isolated from the society. Older people's lives have since been confined to old-age care institutions and are isolated from society. The construction of large-scale old-age care institutions in the countryside in our country is still in its infancy. Although this approach has no impact on institutional operations, it facilitates the management. However, the negative emotions that may occur among the elderly should not be overlooked. The improvement of institutional operation efficiency should be based on humanized design and management. Otherwise, no matter how efficiently the organization operates, the significance of its own existence will be doubtful.

2. Main Factors that may Affect the Elderly's Living Pattern

2.1. Tradition and culture

The tradition and culture are factors affecting the general aging pattern. The culture and tradition difference always lead to a great diversity of the aging pattern.

There is a survey showing that in Europe, there is 5% of the aging population living in the residence. While in China, there are 40% rooms free.

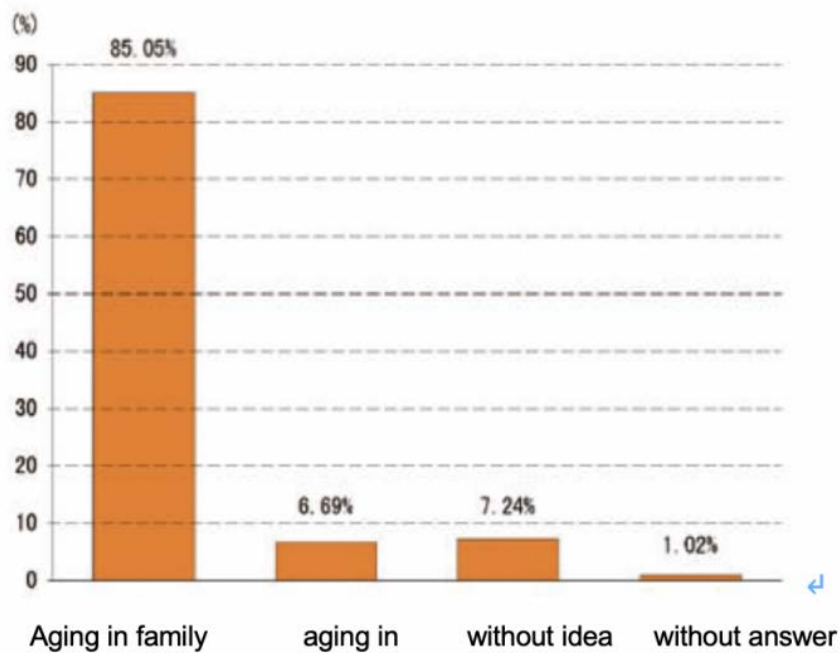


Figure 2.9: Survey on Chinese elderly's choice of aging patterns. (Source: Yanmin Zhou, 2011. The dwelling for the elderly, China Building Industry Press.)

Although today more and more old people in China want to live in the residence, there is still a big gap with Europe. This is mainly because of the big cultural difference. In traditional Chinese mind, the family is very important. Traditional Chinese always think home is the warmest place and all family members should live together. It can be seen in the traditional Chinese living model Siheyuan⁴ that all families live together. When families become bigger, they just construct new rooms around the central yard. Even today, Chinese old people are used to living with their grandsons. When a traditional Chinese old person goes to live in a residence, he/she always feels lonely and being abandoned. But in Europe, it is not common. It is very important to create home sense in Chinese elderly house design.

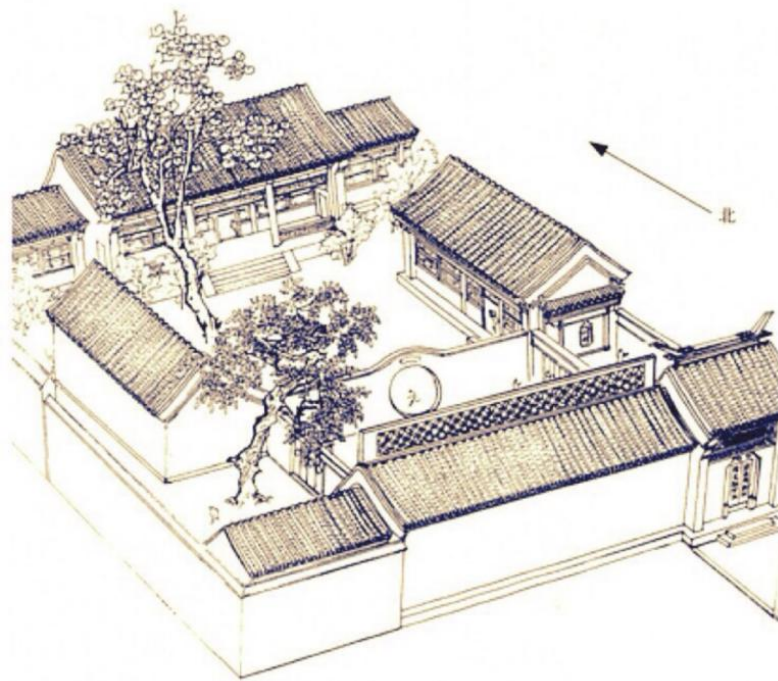


Figure 2.10: Architecture model of traditional home “Siheyuan”. (Source: Liu, Dunzhen, 1984. *History of Chinese ancient architecture*. China Architecture & Building Press. ISBN 9787112019298.)

⁴ Siheyuan is a traditional living architectural style in China. In Siheyuan, there is a big patio in the center. And the rooms stand around the patios. One big family or various small families live together around one patio. They communicate and take activities together in the patio, which effectively avoids the lonely feeling.

Similar aging pattern and concept could be seen in Japan. The traditional Chinese culture is the origin of the Japanese culture. The family values have been strongly rooted in their minds. In 1960's, the "two generations residence" started to be popular in Japan. This living model accepts the pattern that the elderly live close with their children as well as maintains the private space for both the elderly and their children.

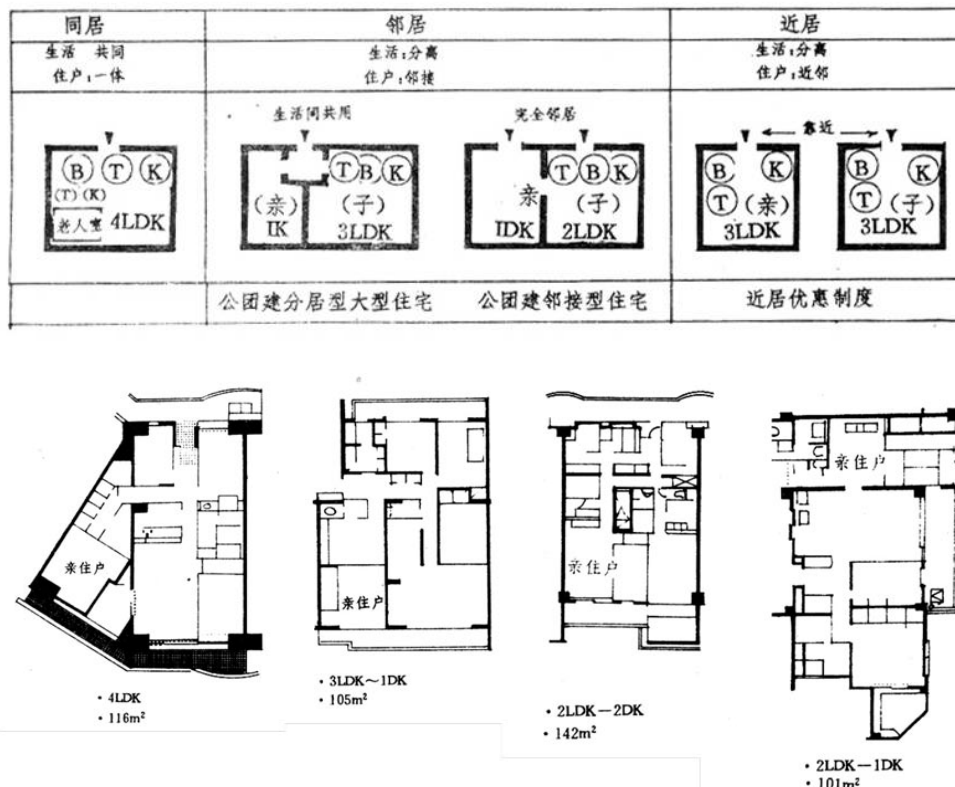


Figure 2.11: Two generations living models. In the models, elderly could live together with their family with respect to their own private spaces. (Source: Yanmin Zhou, 2011. The dwelling for the elderly, China Building Industry Press.)



Figure 2.12: two generations living models. In the models, elderly could live together with their family with respect to their own private spaces. (Source: Yanmin Zhou, 2011. The dwelling for the elderly, China Building Industry Press.)

The main idea of this model is the family value. Based on this, the elderly and the youth both have their independent space which have been partly connected to make it convenient to provide the daily care to the elderly. It reflects the social tradition and culture. Now this living model has been widely used in Chinese elderly house.

In Europe, due to the different culture, another living model can always be seen. Many elderly people would like to live in the nursing home or retirement communities to have a good care.

Hartrigg Oaks retirement community is the first continuing care retirement community in the U.K. It consists of 152 one- and two-bedroom bungalows, together with a 42-bed care home providing residential and nursing care. It is based on the continuing care retirement community model. Hartrigg Oaks aims to provide a socially stimulating environment. It's a place where people can maintain their independence and choice throughout later life. Here the elderly can find various life facilities like coffee shop, restaurant, library, gallery, shops, gym and so on. The elderly could enjoy a safe and convenient life.



Figure 2.13: Public spaces of Hartrigg Oaks retirement community. (Source: google.es)

The comparison between Europe and the orient counties like China and Japan shows the influence of the society culture and tradition on the general living pattern. The Chinese and Japanese culture attach a great importance to the family value. The elderly don't like to live far with their children. In contemporary time, although the traditional mind has been affected by the European thoughts and many young people should live separate from their parents for work or other reasons, living close to their family is still the first choice for the orient elderly instead of living alone in the nursing home or retirement community. In comparison, the European living pattern focuses more on the independent concept. The elderly there don't have so strong demand to live together with their children as the orient. They could enjoy the independent life in the nursing home or retirement community with a enough care.

2.2. Physical factors

The physical care is the basic need of elderly. With age, older people are gradually losing their abilities. The elderly housing with enough accessible facilities permits the older who haven't lost all the life abilities to live independently and conveniently. Those who couldn't live alone need to live in nursing home or with their families to have daily care. The physical condition determines the living pattern to a large extent.

2.3. Emotion

The emotion affects directly the elderly's choice. It shows if the elderly like to live in a space or not. Like said before, the emotion or the feeling of a space shows the space quality. For the elderly, the feeling of the elderly housing mainly reflects

on feeling of security, the relationship with the society, the esthetic feeling and memories.

2.3.1. Feeling of security

The feeling of security could be shown from two parts: the home sense and the safety of the living environment. For most people, home is the most familiar and safe place. When people arrive an unknown place, they always feel unsafe. For the elderly, they could be more sensible for the security of environment. Most elderly like to stay at home with their family rather than remove to a new environment alone. It is because they are easily afraid of the unfamiliar environment where they couldn't have the safe feeling. Now many contemporary elderly housing concentrates on the creation of home sense to make older people have a safe feeling like being at home.

Besides the home sense, the security of the environment is another factor affecting the elderly man's emotion. It means whether older people can live a safe life in the environment. It demands that the space is accessible and convenient for the elderly.

2.3.2. Interactions with the society and personal value

Another important factor affecting the feeling is the relationship with the society. The elderly couldn't be separated from the society. Many older people could have a sad feeling when they lose the work abilities, which brings them a pressure on their mind. The contemporary elderly housing should provide spaces to give the elderly a chance to communicate with the world. These public spaces make the elderly come back to the society and find that their interactions with the society is worthwhile.



Figure 2.14: Social activities in Beijing. (Source: google.es)



Figure 2.15: Home combined with farm. (Source: google.es)



Figure 2.16: Social activities could help elderly find their personal value and keep their passion for life. experience for elderly. (Source: google.es)

2.3.3. Esthetic feeling

The esthetic feeling reflects the beauty of a space which relates directly to whether they like or not a space. Architecture and art always go together. Architecture is a form of arts. The esthetic of architecture space as its form should adapt to the characteristics of times and should be accepted by the people's mind.

For the elderly, the living space is a place to stay for a long time. The elderly housing space should provide an esthetic environment to adapt to the elderly men's mind. The esthetic of a space interacts with the visual as well as the hearing feeling. The study of the esthetic and the creation of an artistic atmosphere help to improve the space feeling, which helps to make a comfortable and happy feeling of a space.

The retirement housing in Rotterdam, Netherlands, by Arons en Gelauff Architecten has tried to find a space as well as its form adapted to the forthcoming retirement of the hippie generation, the user of the architecture.

The project embraces its target market's denial of aging by proposing a playful, colored apartment block. The building is an exciting configuration of a tower and an elevated slab. The slab volume is elevated 11 meters over the water and opens up a spectacular view onto the existing pond from the adjacent pre-existing nursing home. The minimum footprint of the tower creates space for a garden.



Figure 2.17: Retirement housing for hippie in Rotterdam (Source: Arons en Gelauff Architecten, 2006.” Retirement housing for hippie in Rotterdam”, *Archidaily*,2008.)

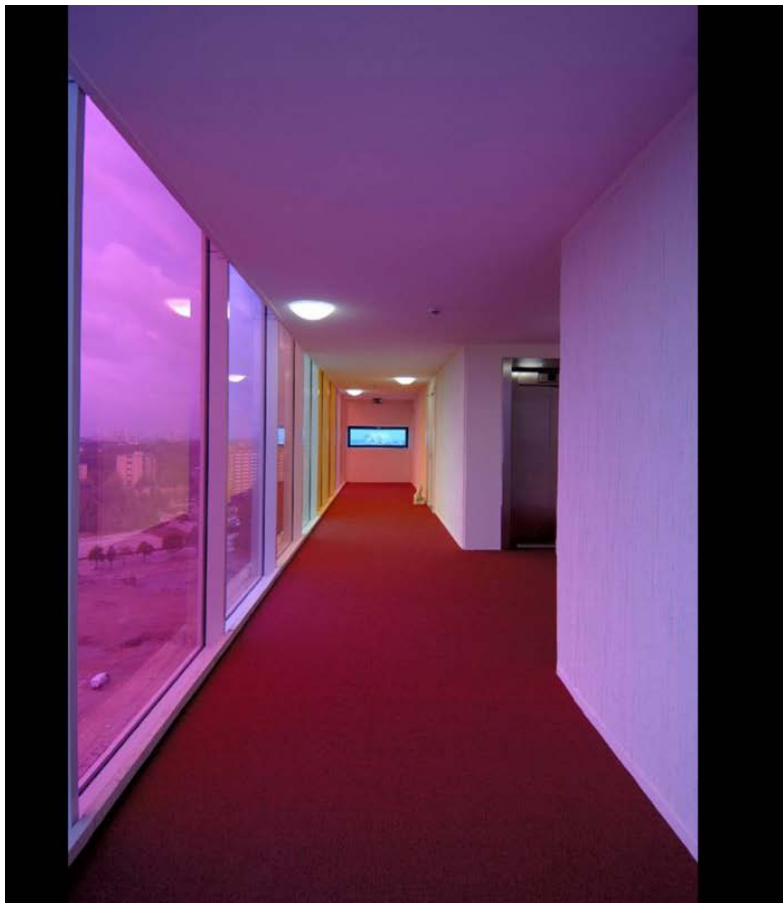


Figure 2.18: Colorful corridors space. (Source: Arons en Gelauff Architecten, 2006.” Retirement housing for hippie in Rotterdam”, *Archidaily*,2008.)

The building is trying to create a space with character of hippie. The wavy balconies create a moving rhythm for the façade, which gives people a strong impression of music. The glazed galleries - set with self-cleaning glass - are smooth but very colorful in over 200 different shades.

In the public space, there are some holes on the wall, which have connected different spaces. These holes are designed in different forms. When the older people pass here, the holes in free forms provide changing visual space images, which help to avoid the boring feeling.

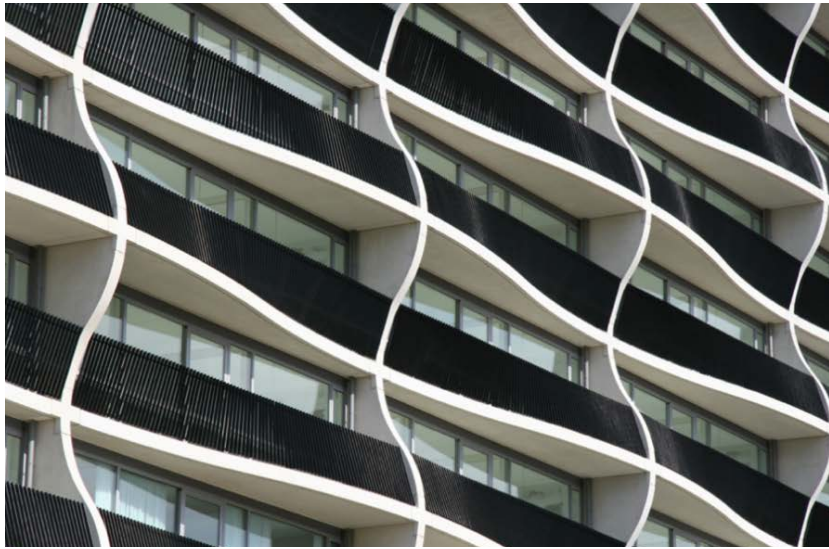


Figure 2.19: Wavy balconies with three dimensions. (Source: Arons en Gelauff Architecten, 2006.” Retirement housing for hippie in Rotterdam”, *Archidaily*,2008.)



Figure 2.20: The interesting holes. (Source: Arons en Gelauff Architecten, 2006. “Retirement housing for. hippie in Rotterdam”, *Archidaily*, 2008.)

2.3.4. Memories

The memories are the personal experiences. The memories have a strong relationship with the environment, the histories, the culture and the passed time. The memories decide the people's knowledge and the view of things, which have a great influence on people's perception and could create a strong emotional resonance. Although everybody has his/her special memories, there are still many common things for the people in the same culture or of the same generation. These common things form the social memories. Today, many architects, artists and designers like to find a nostalgia style in order to create an emotional space. The exhibition *Chinese Times* in the Chinese pavilion at Expo 2010 of Shanghai recreated various memory spaces. Decorated with the representative things of different times, these spaces had brought back the true images from 1960's to 2000's. Every Chinese could find some elements which had ever appeared or used in their childhoods. The interactions with memories make them remember the passing time and easily move people's emotion.



Figure 2.21: Recreation of the scene of Chinese family in 1980's. (Source: www.xinhua.com)

Materials are also carrying memories. The elderly housing is a memory space created by Switzerland using the local wood and stone. Most the local older people have ever lived in the stone and wood house when they were young. The familiar materials make them remember their young hood.



Figure 2.22 & 2.23: The local wood and stone. (Source: Residential Home for the Elderly, Masans, Chur, Graubünden, Switzerland, 1993 | Peter Zumthor)

2.4. Economy

Economic reasons are playing important roles when the elderly choose their living place. In China, most private nursing homes are in a high price as well as the new constructed residence area for the elderly. Normal people don't have the economic abilities to move into these places. For most older people, aging at their original home is a more economical way.

2.5. Policy

In many European countries, there is a complete policy system to make sure the care of the elderly. Like said before, in Sweden, the accessible design has been a rule for the living space design. In Japan, the government has put forward laws to regular the elderly housing design and to promote the investigations of the elderly and accessible facilities. These policies force the society to think about the elderly's needs.

3. Main Problems of Current Chinese Elderly Housing compared with Europe

3.1. Current Chinese elderly housing development direction couldn't meet social conditions and requirements

To meet the requirements of aging at home, architects has made attempts to create a new elderly housing model. New residence area for elderly is the main development direction of Chinese elderly housing. These new residence areas do provide a healthy environment and convenient life conditions for the elderly. But it doesn't work out effectively to solve current aging problems. It is because that these elderly housing development directions doesn't meet the general social conditions and requirements.

Firstly, the main problem is economy. These new residence areas for elderly are well equipped with necessary accessible facilities and medical service, which leads to a high construction cost. As said before, Chinese government still doesn't have such a economic capacity to cover these cost, which leads to the flats in these areas having to be sold at a high price. Normal Chinese people haven't been able to buy this flat. On this social economic condition, these new residence areas can only service for a little part of the Chinese elderly. Most Chinese elderly people have to choose to stay in their original house. In future, Chinese elderly housing should have a more economic development direction that can adapt to current social situation and meet the requirements of most elderly people.

Secondly, to have a better natural environment, these new residence areas are always located outside the city. Like in the case of Suncity elderly residence area, it is 30km far from centre Beijing. This dose provide a better and more healthy environment for the elderly, but on the other hand, it has limited the social life

and relationship of the elderly. While social relationship is very important to avoid negative emotions of loneliness for the elderly. This also makes the elderly not like to live in these residence areas for a long time.

Due to these reasons, the development of new elderly residence areas couldn't solve current aging problems in China. Chinese elderly housing should have more diversified developments. In fact, with studying European experience in aging problems, Chinese government has already paid more attention to elderly-oriented refurbishing. Some refurbishing attempts have been done in big cities. Elderly-oriented refurbishing provides a more economical way for normal people, which could create a better and more convenient life environment in their original home. Besides, it is a necessary way to realize Chinese aging in place pattern. For Chinese current social situations, it would be a more appropriate way to reduce aging pressure. How to refurbish their original houses to make it accessible and convenient for the elderly will be an important theme for Chinese elderly.

3.2. Lack of design awareness and systematic regulations for elderly housing

Compared with Europe, the lack of design awareness for the elderly is a huge obstacle to solving Chinese aging problem. Design for the elderly hasn't become a common concept for Chinese people. Elderly-oriented design seems only exist in those special residence. Even many elderly housing projects are designed without a deep thinking. Elderly housing is not just a space equipped with accessible facilities. It should be designed depending on different needs and situations of the elderly. Chinese society should attach more importance to aging problems. Chinese architects should treat elderly-oriented design as a basic and common concept and combine it in their design in a more natural and humanized way, like what has been done in Europe developed countries or Japan.

Systematic regulations could help improve the social awareness of elderly-oriented design as well as elderly housing qualities. For aging problem, Chinese government has made effort to improve elderly housing qualities including putting forward policies, and making elderly housing design norm. However, there is still a lack of systematic standards in further improving the services, facilities, and operation management of elderly housing. The development of Chinese elderly housing has suffered many setbacks, and the service quality for elderly housing hasn't been well supervised.

“There are more than 600 regulations to manage and supervise elderly housing qualities in Hong Kong. It has detailed rules to regular qualifications of caregivers, surrounding environments, public space, facilities and elderly products.”⁵

Systematic regulations could ensure elderly housing design quality and administration system to provide effective protections for the elderly. It also can make the society attach more importance to aging problems and improve the elderly-oriented design awareness. It is a necessary way for Chinese contemporary elderly housing development.

3.3. Lack of design for the emotional needs of Chinese elderly

Apart from physical requirements, emotional factors affect directly elderly's feeling for their life environment. Elderly housing quality is related closely to elderly's emotional needs. Compared with young people, the elderly are more sensitive and have higher requirements on space feeling. The lack of emotional care would lead to mental problems for the elderly. Not only in China, the elderly in all the world are suffering big mental problems.

⁵ Tao Liqun, Wang Lily and Ma Fengli (2008). Analysis of Chinese elderly housing situation. Report from the Policy study centre of Ministry of Civil Affairs of the People's Republic of China.

“Over 20% of adults aged 60 and over suffer from a mental or neurological disorder (excluding headache disorders) and 6.6% of all disability (disability adjusted life years-DALYs) among people over 60 years is attributed to mental and neurological disorders. These disorders in older people account for 17.4% of Years Lived with Disability (YLDs). The most common mental and neurological disorders in this age group are dementia and depression, which affect approximately 5% and 7% of the world’s older population, respectively. Anxiety disorders affect 3.8% of the older population, substance use problems affect almost 1% and around a quarter of deaths from self-harm are among people aged 60 or above. Substance abuse problems among older people are often overlooked or misdiagnosed.

Mental health problems are under-identified by health-care professionals and older people themselves, and the stigma surrounding these conditions makes people reluctant to seek help.” (Mental health of older adults. World Health Organization, 2017,12)

Contemporary elderly housing should provide a healthy environment both for mind and body.

3.3.1. Space emotional design

According to the psychological characteristics of elderly, they always have basic emotional needs. But in current Chinese elderly housing design, many people’s knowledge of elderly housing is simply equipped with accessible facilities ignoring general emotional needs of the elderly. As a result, many elderly houses in China residences are just like hospitals without any sense of belonging. The lack of home sense and private space could make the elderly feel inconvenient and unsafe, which brings them negative feeling for the elderly housing. Besides, the lack of thinking on elderly’s emotional needs results in ignoring their desire for social relationship. Many elderly residences are not equipped with enough public space to provide different social activities.

“In many residential area, there isn’t a good public space close, people always go a long way to the park to take activity, where they will find more people.” Said Yanmin Zhou, expert of elderly housing design of Tsinghua University, in her research *The Need for the Landscape and Public Space of Ageing*.

China has a situation that more and more young people leave their families to find better work opportunities in developed cities. Many old people have to live alone. This has left the elderly in big risks of mental problems. Facing to this situation, emotional care becomes more and more important. Elderly housing, as the most frequently contacted space for the elderly, should be designed with emotional atmosphere creations. It should be a basic requirement for Chinese contemporary elderly housing design.

3.3.2. Special emotional needs of the Chinese elderly compared with Europe

Compared with Europe, Chinese contemporary elderly housing design should be done with thinking the difference between China and Europe. Chinese people have the general psychological characteristics and the special features formed by the special culture. Chinese elderly housing design should pay attention to the special emotional needs of Chinese people.

Apart from elderly housing design, Chinese contemporary architecture has suffered from the loss of cultural identity. During a long period, copy remains a big problem of Chinese contemporary architecture. People brought successful architecture models from Europe or America, and used them directly in Chinese projects. This way ignored the difference between China and foreign countries and most of these projects didn’t work well to adapt to Chinese characteristics. Chinese contemporary architecture should learn experience from developed countries with adaption to Chinese society and culture, especially for elderly housing. Chinese contemporary housing design should be realized with well thinking about the special emotional needs of Chinese people.

The main difference between China and Europe is culture. Culture difference makes China form its own architecture styles and has affected directly the

elderly's understanding and perceptions of family, life and society. Cultural identify of a space could arouse the emotional resonance of the elderly and make them have more recognition of the space.

4. Chinese Elderly Housing Development Direction Facing to Chinese Aging Situation

Chinese elderly housing development should respect current aging situations to solve effectively aging problems. Aging in place is still the main pattern depending on Chinese social characteristics. Instead of developing new residence areas for the elderly, Chinese people should pay more attention to elderly-oriented refurbishing of their original houses. It is a new direction that could improve the life qualities with less economical pressure for most old people.

Refurbishing means not only improving accessible facilities and technology, but also creating a mental-health environment. Mental health is directly affecting the physical conditions of the elderly. Space in good quality should be equipped with physical needs as well as emotional needs. In future, emotional atmosphere creation based on special psychological characteristics of the Chinese elderly should be considered in Chinese elderly housing refurbishing process. In this way, we can really provide a healthy space suitable for the Chinese elderly.

Chapter 3

Development state of emotional design study in contemporary architecture

1. Perception, emotion and space value based on phenomenology concepts

Perception is the organization, identification, and interpretation of sensory information in order to represent and understand the presented information, or the environment.⁶ Space perception refers to the process through which humans and other organisms become aware of the relative positions of their own bodies and objects around them.⁷ Space perception involves with human's feelings, then forming some emotions⁸.

*“When we speak of man and space, it sounds as though man stood on one side, space on the other. Yet space is not something that faces man. It is neither an external object nor an inner experience. It is not that there are men, and over and above them space”*⁹ said Martin Heidegger who linked space indivisibly with the human condition. Space exists as a place with series interactions with human. These interactions form space perceptions and furthermore creates some

⁶ Schacter, Daniel (2011). Psychology. Worth Publishers

⁷ Encyclopaedia Britannica. <https://www.britannica.com/science/space-perception>

⁸ Emotions happen in the back of our consciousness. It is not until they register in the foreground as a feeling that we are aware of having an emotional experience. Basically, the difference between an emotion and a feeling depends on the process --- emotion emerge as a feeling (Eberhard, 2007)

⁹ Martin Heidegger. *Building, dwelling, thinking, in Id., Basic writing*, New York, Harper& Row, 1997, p.334

emotions, affecting human's judgements of space. When a person enters a space, there are series interactions happened immediately between space elements and his mind. He can get information from material and immaterial properties of space by seeing, touching, hearing and smelling. The existed information interacts with the mind forming some perceptions of the space. These perceptions refer to human physical cognitions of environment resource, as shape, position, distance, gravity, scales as well as understandings in scale of culture, history, arts, which direct human's behaviors and movements in the space. The behaviors and movements are not only physical ones but also mental ones. Human's perceptions of the space immediately process some positive or negative feelings and impressions, involving with their original acknowledges and experience of aesthetics, life, society...etc. "*I enter a building, see a room, and – in the fraction of a second – have this feeling about it*"¹⁰. These feelings and impressions gather into mental emotions, which affects human's judgments of the space. The emotions give human answers of questions like whether they like or dislike the space, if they want to stay in the space or not and know if the space adapts their mental requirements, then creating some kinds of value for the space.

Perceived space

Henri Lefebvre, a French Marxist philosopher and sociologist, has introduced Perceived space to describe this interaction among human's perception, emotion and space. Perceived space is a result of human and spatial contexts, reflecting directly their understanding and judgments of a space or environment.

The perceived space describes the most intimate interaction between human being and architecture since this implies an interpretative mental process that is performed individually by each person who enters a particular architectural space (Jonas E Andersson, 2011). Human, or human's mental movements, is a necessary condition to the exists of perceived space compared with physical space. It differs from each person associated with their personal acknowledge and experience.

¹⁰ Peter Zumthor. *Atmosphere – Architectural environments – Surrounding objects*, Basel-Boston- Berlin, Birkhauser, 2006, p.13.

In architectural field, perceived space is produced during the cognition process between human and architecture interior as well as exterior space. Jonas E Andersson, Associate professor of KTH Royal Institute of Technology has described the process of perceived space with the following image in his doctor thesis: “Architecture and Ageing: The Interaction Between Frail Older People and the built environment” about perceived architectural space:

“The human understanding of the exterior and interior architectural space creates a third type of space, the perceived space (Merleau-Ponty, 1945); This space is characterized by the possibility of transcending from the interior architectural space to the exterior one and back again. Trans spatiality is the emblematic feature of existence: “(...) the plurality of events that trans spatiality generates (...) space and time (...) is the essence of existence” (Barbaras, 2000, p. 58).⁵⁴ The exterior, inner and perceived dimensions of architecture converge into the creation of a milieu that is the resultant outcome for human interactions with the built space. The experience of the three architectural spaces is perceived as a state of mind that is linked with a bodily sensation (Wölflin, 1886). The human perception of this milieu may affect everyday living since the ambiance of this milieu induces moods of like or dislike by the individual (Merleau-Ponty, 1945).”

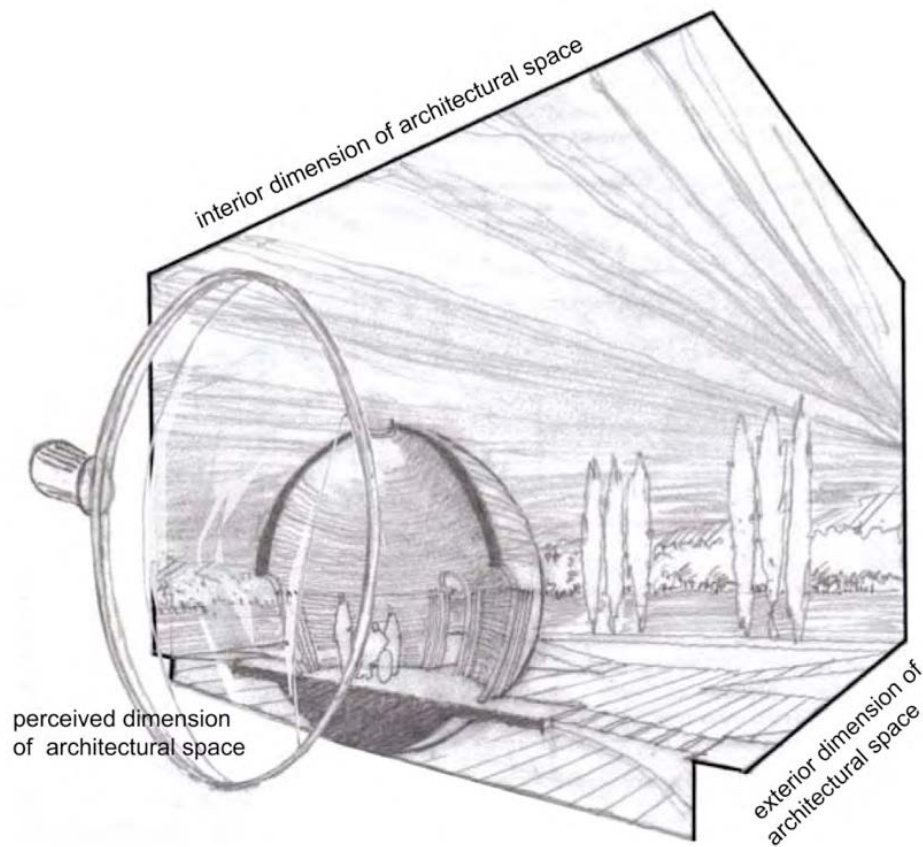


Figure 3.1: The three types of architectural space—the interior space, the exterior space and the perceived space—that are activated in the human interactions with the built environment. (Source: Jonas E Andersson, 2011. *Architecture and Ageing: The Interaction Between Frail Older People and the built environment*. Doctor Thesis in Architecture, KTH/ School of Architecture, Sweden.)

Value of space

Based on this theory, human's interactions, especially mental interactions, result in the birth of perceived space. The existence of perceived space has demonstrated social meanings of a geography space, making space have its humanistic characteristics. Physical space is given some value and judgment which reflect its meaning and use to human society. These humanistic interactions make space change to a complex social product rather than a simple geography site. *"Space is a (social) product [...] the space thus produced also serves as a tool of thought and of action [...] in addition to being a means of production it is also a means of control, and hence of domination, of power."*¹¹ Said Henri Lefebvre, a French Marxist philosopher and sociologist. Space is a social product, or a complex social construction.¹² To human society, social characteristics is the most important value and meaning, which makes a space develop. Design conceptions of perceived space could decide spatial social characteristics and its value. On this point, in space creation process, positive emotional touches should be always given to affect the image of perceived space. While the positive touches could be realized by satisfactions to human's requirements and desires of life, dwelling, politics, society, culture and arts.

"Lefebvre argued that every society—and, therefore, every mode of production—produces a certain space, its own space. The city of the ancient world cannot be understood as a simple agglomeration of people and things in space—it had its own spatial practice, making its own space (which was suitable for itself—Lefebvre argues that the intellectual climate of the city in the ancient world was very much related to the social production of its spatiality). Then if every society produces its own space, any "social existence" aspiring to be or declaring itself to be real, but not producing its own space, would be a strange entity, a very peculiar abstraction incapable of escaping the ideological or even cultural spheres. Based on this argument, Lefebvre criticized Soviet urban planners on the basis that they failed to produce a socialist space, having just reproduced the modernist model of urban design (interventions on physical space, which were insufficient to grasp social space) and applied it onto that context:

¹¹ Lefebvre, Henri, *The Production of Space*, Blackwell, 1991, ISBN 0-631-18177-6. p. 26.

¹² https://en.wikipedia.org/wiki/Henri_Lefebvre#cite_note-27

‘Change life! Change Society! These ideas lose completely their meaning without producing an appropriate space. A lesson to be learned from soviet constructivists from the 1920s and 30s, and of their failure, is that new social relations demand a new space, and vice-versa’¹³.” (The social production of space, Henri Lefebvre’s thoughts, Wikipedia)¹⁴

Based on this concept, whether a space can continue existing with value depends on if it meets social requirements. While these requirements refer to the physical ones like functions, scales, forms, as well as emotional ones like arts, culture, personal value and comfortability. Emotional reasons, apart from rational cognitions of space functions and other properties, have played an important role to affect human’s judgments and selections. Physical properties of a space make people have perceptions and promote people to form corresponding emotions. The emotions, which affect a lot human’s judgments of the space, help to judge the space value, determining if the space grows or demises.

“In the fusion of place and soul, the soul is as much of a container of place as place is a container of soul, both are susceptible to the same forces of destruction”¹⁵. Robert Pogue Harrison, an American literary scholar, states poetically about this process of interaction between space and human’s mind.

¹³ Lefebvre, Henri The Production of Space, Blackwell, 1991, ISBN 0-631-18177-6. p. 59

¹⁴ https://en.wikipedia.org/wiki/Henri_Lefebvre#cite_note-28

¹⁵ R.Pogue Harrison, *Gardens: an essay on the human condition*, Chicago- London, The University of Chicago Press, 2008, p. 130

2. Developments of contemporary emotional design theory study

Emotional design approach has been applied and developed because of the increasing influence of human's emotion on design field. In the last few decades, human's civilization has passed from model to contemporary period, accompanied by the rapid developments of technology and industry. Material satisfaction makes people move their focus from function, practicality and economy to aesthetics, pleasant and other emotional characteristics. In design field, including architecture, industry and other kinds of design, human's emotion has played a more and more important role to affect their choice and judgments of design products. Emotional design is just brought forward on this background. It is a design approach that takes human's emotion as essential.

“Emotional Design emerged as the effort to promote positive emotions (Norman, 2007)¹⁶ or pleasure in users (Jordan, 2002¹⁷; Green and Jordan, 2003¹⁸) by means of design properties of products and services. According to Van Gorp and Adams (2012), design based on emotions can affect overall user experience deeply, since emotions influence decision making, affect attention, memory, and generate meaning.”(Front Psychol. 2017)¹⁹

¹⁶ Norman D. A. ,2007. *Emotional Design: Why We Love (or Hate) Everyday Things*. New York: Basic Books.

¹⁷ Jordan P. W., 2002. *Designing Pleasurable Products—An Induction to the New Human Factors*. London: Taylor and Francis.

¹⁸ Green W., Jordan P. , 2003. *Pleasure with Products: Beyond Usability*. London: Taylor and Francis.

¹⁹ Stefano Triberti, Alice Chirico, Gemma La Rocca, and Giuseppe Riva, 2017. Developing Emotional Design: Emotions as Cognitive Processes and their Role in the Design of Interactive Technologies. *Frontiers in Psychology*, 2017 Oct. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5640767/>

2.1. Emotional design theory of Donald Norman

Donald Norman, director of The Design Lab at University of California, San Diego, has augured in his book *“Emotional Design: Why we love (or hate) everyday things”* his concepts of emotional design that the emotional side of design may be more critical to a product's success than its practical elements.²⁰

In the former book of Norman *“The Design of Everyday Things”*, he has already commented that the most important elements for design is users. A well worked design should be user-centered. But as he did in this book, by the influence of modern industry, user-centered design approach mainly focused on functions, usability and utility in a long period. Designers would like to think about human's behaviors in a more logical and rational way, ignoring emotion affects. Design tended to be more rational, useful, economic and easier to use. On the contrary, aesthetics, pleasure and other emotional factors were easily neglected by designer.

“This is so despite the common tendency to pit cognition against emotion. Whereas emotion is said to be hot, animalistic, and irrational, cognition is cool, human, and logical. This contrast comes from a long intellectual tradition that prides itself on rational, logical reasoning. Emotions are out of place in a polite, sophisticated society. They are remnants of our animal origins, but we humans must learn to rise above them. At least, that is the perceived wisdom.” (Norman, 2007, p7)

For Norman, the book *“Emotional Design: Why we love (or hate) everyday things”* presented his reflective comments on his former book. He has noticed that emotion and cognition can't be separated into two parts. *“Emotions are inseparable from and a necessary part of cognition. Everything we do, everything we think is tinged with emotion, much of it subconscious. In turn, our emotions*

²⁰ Norman D. A. (2007). *Emotional Design: Why We Love (or Hate) Everyday Things*. New York: Basic Books.

change the way we think, and serve as constant guides to appropriate behavior, steering us away from the bad, guiding us toward the good.” (Norman, 2007, p7)

Human’s emotion has played an important role that affects people’s decisions, thoughts and behaviors, and conducts human’s judgments beyond consciousness. It is both an experience and scientific result of brain process.

“A major theme of this book is that much of human behavior is subconscious, beneath conscious awareness. Consciousness comes late, both in evolution and also in the way the brain processes information; many judgments have already been determined before they reach consciousness. Both affect and cognition are information-processing systems, but they have different functions. The affective system makes judgments and quickly helps you determine which things in the environment are dangerous or safe, good or bad. The cognitive system interprets and makes sense of the world. Affect is the general term for the judgmental system, whether conscious or subconscious. Emotion is the conscious experience of affect, complete with attribution of its cause and identification of its object. The queasy, uneasy feeling you might experience, without knowing why, is affect.” (Norman, 2007, p.11)

“We cognitive scientists now understand that emotion is a necessary part of life, affecting how you feel, how you behave, and how you think. Indeed, emotion makes you smart. That's the lesson of my current research. Without emotions, your decision-making ability would be impaired. Emotion is always passing judgments, presenting you with immediate information about the world: here is potential danger, there is potential comfort; this is nice, that bad. One of the ways by which emotions work is through neurochemicals that bathe particular brain centers and modify perception, decision making, and behavior. These neurochemicals change the parameters of thought.” (Norman, 2007, p.10)

“In the 1980s, in writing The Design of Everyday Things, I didn't take emotions into account. I addressed utility and usability, function and form, all in a logical, dispassionate way—even though I am infuriated by poorly designed objects. But now I've changed. Why? In part because of new scientific advances in our

understanding of the brain and of how emotion and cognition are thoroughly intertwined. We scientists now understand how important emotion is to everyday life, how valuable. Sure, utility and usability are important, but without fun and pleasure, joy and excitement, and yes, anxiety and anger, fear and rage, our lives would be incomplete.” (Norman, 2007, p.8)

Emotional factors are decisive on human's judgments of design. Emotional design is to start from people's emotional needs, to think people's feeling and experience, to ask if people would enjoy or be pleasant of the design. Functions, usability and utility are not enough for a valuable design. People value things depends on their emotions to a large extent, like Norman doing in his example of teapots.

“I value my teapots not only for function for brewing tea, but because they are sculptural artwork. I love standing in front of the window, comparing the contrasting shapes, watching the play of light on the varied surfaces. When I'm entertaining guests or have time to spare, I brew my tea in the Nanna teapot for its charm or in the tilting pot for its cleverness. Design is important to me, but which design I choose depends on the occasion, the context, and above all, my mood. These objects are more than utilitarian. As art, they lighten up my day. Perhaps more important, each conveys a personal meaning: each has its own story. One reflects my past, my crusade against unusable objects. One reflects my future, my campaign for beauty. And the third represents a fascinating mixture of the functional and the charming.” (Norman, 2007, p.4)

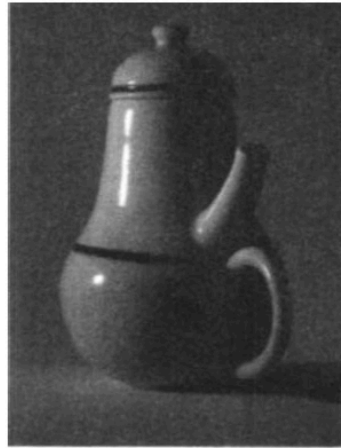


FIGURE 0.1

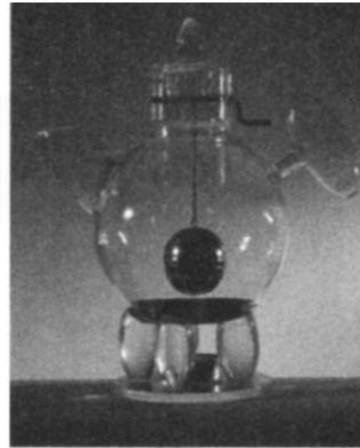
An impossible teapot.*(Author's collection.)**Photograph by Ayman Shamma.)*

FIGURE 0.2

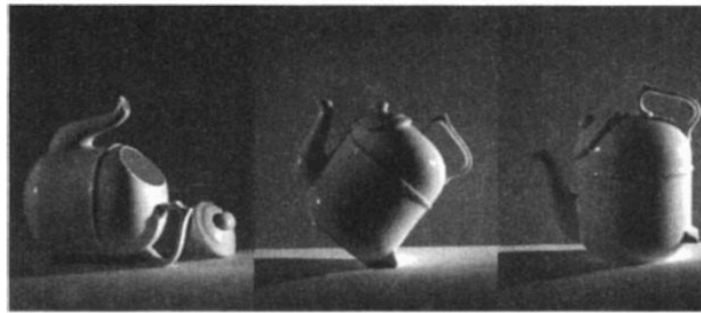
Michael Graves's "Nanna" teapot.*So charming I couldn't resist it.**(Author's collection.)**Photograph by Ayman Shamma.)*

FIGURE 0.3a, b, and c

The Ronnefeldt "tilting" teapot. Put leaves on the internal shelf (not visible, but just above and parallel to the ridge that can be seen running around the body of the teapot), fill with hot water, and lay the teapot on its back (figure a). As the tea darkens, tilt the pot, as in figure b. Finally, when the tea is done, stand the teapot vertically as in figure c, so the water no longer touches the leaves and the brew does not become bitter.

(Author's collection. Photographs by Ayman Shamma.)

Figure 3.2: Three types of teapot as an example to see the emotional influence on people's judgments of design products. (Source: Norman D. A. (2007). *Emotional Design: Why We Love (or Hate) Everyday Things*. New York: Basic Books.)

Emotion also affects a lot human's everyday life. In Norman's opinion, negative moods make people focus and do more efforts. While positive moods make people creative. Different emotions make people stay in different life situations. Good design should work on emotion and help to adjust people's behaviors adapted to different life situations. As in architecture space, a good design should conduct people's feelings and emotions to make them have suitable behaviors and better states facing to their different life needs of working, studying, living, visiting...etc.

On the other hand, emotional communications and interactions are necessity for human. Positive emotional environments can improve human's enthusiasm for life. *"Without pride in the quality of our actions, why would we endeavor to do better? The positive emotions are of critical importance to learning, to maintaining our curiosity about die world. Negative emotions may keep us from danger, but it is positive emotions that make living worthwhile, that guide us to the good things in life, that reward our successes, and that make us strive to be better."* (Norman, 2007, p.166)

Norman introduced three design levels associated with human's psychology process: visceral, behavioral, and reflective. Design worked on human's emotion from the three aspects. Visceral level refers to human's instants moods. When people see a design product or enter a space, the appearance creates a first impression or feeling immediately. Behavioral level is related to the function and use experience: if they feel enjoyable and pleasure during using process. And reflective level is related to personal acknowledge, cognitions, culture, memories, tradition, arts...etc. It refers to a reflection and comment after the experience and perceptions of a design. It would be very different associated with different personalities and can provide the deepest influence on human's mind.

"It is only at the reflective level that consciousness and the highest levels of feeling, emotions, and cognition reside. It is only here that the full impact of both thought and emotions are experienced. At the lower visceral and behavioral levels, there is only affect, but without interpretation or consciousness."

Interpretation, understanding, and reasoning come from the reflective level.”
(Norman, 2007, p.38)

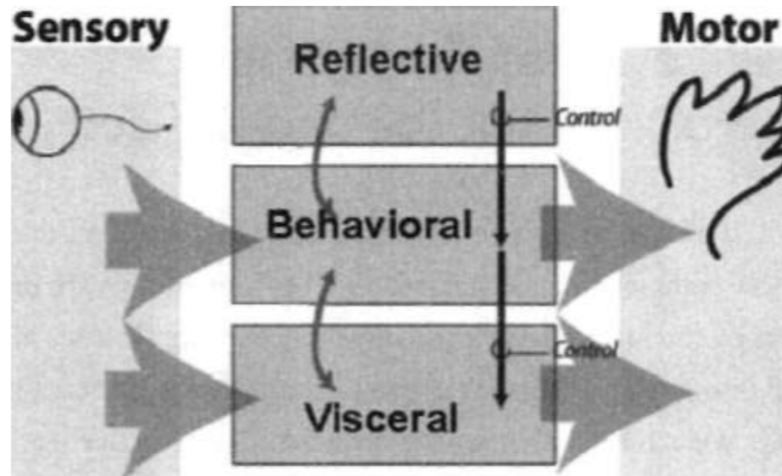
“There is one other distinction among the levels: time. The visceral and behavioral levels are about "now," your feelings and experiences while actually seeing or using the product. But the reflective level extends much longer—through reflection you remember the past and contemplate the future. Reflective design, therefore, is about long- term relations, about the feelings of satisfaction produced by owning, displaying, and using a product. A person's self-identity is located within the reflective level, and here is where the interaction between the product and your identity is important as demonstrated in pride (or shame) of ownership or use. Customer interaction and service matter at this level.”
(Norman, 2007, p.38)

Emotional involvements from these three levels, or one of them, could work effectively on customer's choices of designs. The success of BMW's new MINI Cooper car has proved the importance of emotional influence on customer's choices. In 60s', Mini cooper car had been the most popular and fashion car at that time. It was a strong symbol of that generation. When BMW company acquired and started to launch new MINI cars, designers kept the main characteristics of original Mini cooper car appearance. Although new MINI cars haven't maintained their original scales in order to meet contemporary car's requirements of space and functions, those memorial codes of appearance are enough to give strong stimulation on people's emotion. It has worked on both visceral and reflective level to remind people's memory and love from first sight to deep thoughts. It creates a positive emotion interacted with people's memory which affects their choices to the large extent.

“In reviewing BMW's MINI Cooper car, the New York Times observed: “Whatever one may think of the MINI Cooper's dynamic attributes, which range from very good to marginal, it is fair to say that almost no new vehicle in recent memory has provoked more smiles.” (Norman, 2007, p.18)



Figure 3.3: Comparison of classic Mini Cooper and new BMW's MINI (Source: <https://www.bmwblog.com/2014/08/28/good-things-small-packages-new-mini-vs-old/>)



Three levels of processing: Visceral, Behavioral, and Reflective.

The visceral level is fast: it makes rapid judgments of what is good or bad, safe or dangerous, and sends appropriate signals to the muscles (the motor system) and alerts the rest of the brain. This is the start of affective processing. These are biologically determined and can be inhibited or enhanced through control signals from above. The behavioral level is the site of most human behavior. Its actions can be enhanced or inhibited by the reflective layer and, in turn, it can enhance or inhibit the visceral layer. The highest layer is that of reflective thought. Note that it does not have direct access either to sensory input or to the control of behavior. Instead it watches over, reflects upon, and tries to bias the behavioral level.

(Modified from a figure by Daniel Russell for Norman, Ortony, & Russell, 2003.)

The three levels can be mapped to product characteristics like this:

| | | |
|-------------------|---|------------------------------------------------|
| Visceral design | > | Appearance |
| Behavioral design | > | The pleasure and effectiveness of use |
| Reflective design | > | Self-image, personal satisfaction, memories |

Figure 3.4: Emotional involvements work from three levels (Source: Norman D. A. (2007). *Emotional Design: Why We Love (or Hate) Everyday Things*. New York: Basic Books.)

These three design levels can be also applied in architecture. A good space could create emotional resonance and experience from the three aspects. When people enter a space, they can immediately have their impressions and feelings from architectural appearance as shapes, colors, scales and materials, which give people the first answer of whether the space is attractive for them. Good functions can give people enjoyable using experience which deepen their positive feelings. And connections to memories, culture, personalities can create a long-term emotional reflection. The emotional experience gets deeper step by step. Space design should be started with considerations on the characteristics and special requirements of its user and then provide a complete emotional experience from all these three levels. That's the way to create an emotional environment which really works positively and effectively on human's mind.

2.2. Emotional design study in Japan

Emotional design, also known as Kansei engineering in Japan, has been investigated systemically in last decades. *“Kansei engineering aims at the development or improvement of products and services by translating the customer's psychological feelings and needs into the domain of product design (i.e. parameters). It was founded by Mitsuo Nagamachi, Professor Emeritus of Hiroshima University (also former Dean of Hiroshima International University and CEO of International Kansei Design Institute). Kansei engineering parametrically links the customer's emotional responses (i.e. physical and psychological) to the properties and characteristics of a product or service. In consequence, products can be designed to bring forward the intended feeling.”* (Kansei engineering, wikipedia)²¹

Originating in Japan, kansei engineering was firstly applied in automotive design. With people paying more attention to human's emotional requirements, kansei engineering started to be widely introduced in all kinds of design, as architecture,

²¹ https://en.wikipedia.org/wiki/Kansei_engineering

fashion, artwork, interior decoration...etc. Similar to Norman's emotional design theory, kansei engineering concentrates on people's feeling and requirements of products based on analysis of human's psychological characteristics. There are three focal points in kansei engineering approach: accurately understanding consumer's feeling and requirements of products; reflects and translation of human's feelings and requirements at both qualitative and quantitative levels into product design proprieties; Creation of a system and organization for emotional orientated design.²² Kansei engineering approach tries to find connections between human's emotion and product proprieties by scientific analysis in order to create an emotional design methodology generically applied in different fields. Now kansei engineering has already had a lot of research results to work effectively on human's emotion. But there are still some problems to be solved. The differences of individual on personalities, culture, perceptions always make people have different feelings and emotions of the same design. How to adapt to these individual emotional differences is an important problem for Kansei engineering in the future.²³

3. Exploration of Emotional design approach in architecture practice

When came into modernism, discussions about the nature of architecture had experienced a big revolution. Humanity of architecture received more and more attentions. Architects changed their focus from architecture appearance and decorations to architectural space and its interactions with society. Human's requirements became a central problem of architecture design. Architecture

²² https://en.wikipedia.org/wiki/Kansei_engineering

²³ Ding Jun-wu, Yang Dont-tao, Cao Yadong and Wang Lin, 2010. Theory, method, and trend of emotional design. *Journal of Engineering Design*, Vol.17 No.1. Feb, 2010.

started to be treated as a result of social and human's activities. And it worked not only to provide some kinds of function and space, but also a satisfaction to the development desire of human society. This satisfaction was especially shown in aspect of spirit and emotion. Architecture design has become more human-orientated. Human, especially their feelings and emotional needs, started to be treated as the basic factor in this study.

This concept became more popular after the proposal of phenomenology theory. With a marked influence from the writings of Martin Heidegger, phenomenology began to have a major impact on contemporary architectural theory. As said some decades later in Muntanola's book "*La Arquitectura como lugar*"²⁴ that in phenomenology architecture is defined as "the place" rather than "the site". Here "the place" is not so simple as a physical object, but consists of its spirit and social meanings. Architecture always develops adapted the interactions between human and environment. The essence of architecture is a social phenomenon associated with people's activities, desire and perceptions rather than a simple object.

Emotional affect has been related to human's judgments and space qualities. Compared with other design kinds, architecture space has played a more important role in human's life. Human is contacting with space every minute. All life activities have happened in some kind of space. Space design has closely connected with human's life and made some affect on their mind. As said before, emotion can affect people's states of life activities. Contemporary architecture should provide suitable emotional experience and mental communications rather than its usability to adjust people's life states. It is the essential value of contemporary architecture. According to Norman's three design levels, good architecture should reach these three levels to create complete emotional touch and experience for people.

As representative, Gunner Asplund, Luis Kahn, Tadao Ando and Peter Zumthor, have made a lot of contributions to both architecture emotional design theory and practice from different aspects.

²⁴ Muntanola Thornberg, José, 2001. *La Arquitectura como lugar*. Edicions UPC. ISBN9788498801682.

3.1. Gunnar Asplund

Inspired by German philosopher Oswald Spengler's theory "The decline of the West"²⁵, Gunnar Asplund had put forward his concepts of modern architecture space in his lecture "Our architectonic concept of space"²⁶ for being appointed professor of architecture at the Royal Institute of Technology in Stockholm. Asplund, known as a key representative of Nordic Classicism of the 1920s, and during the last decade of his life as a major proponent of the modernist style which made its breakthrough in Sweden at the Stockholm International Exhibition (1930)²⁷, was always looking for new order and meaning of modern space adapted to the development of cities, society and humanity. Asplund was always looking for "a balance" in his projects from different aspects, between technology and functions, modern and historic, architecture and nature. In his concepts, he thought modern space, compared with classical ones, should be more flexible, open, inclusive and healthy to adapt the renovations of society and human, in order to provide a comfortable and pleasure feeling for people. This balance is a key point to finally create a satisfied emotional environment for people.

This balance can be found in his famous project Stockholm Cemetery. This architecture for death has shown poetic balances between nature and architecture, functions and aesthetics, reality and emotion, looking for a final spiritual tranquility.

²⁵ The Decline of the West (German: *Der Untergang des Abendlandes*), or The Downfall of the Occident, is a two-volume work by Oswald Spengler, the first volume of which was published in the summer of 1918. Spengler revised this volume in 1922 and published the second volume, subtitled *Perspectives of World History*, in 1923.

²⁶ Gunnar Asplund, 1982. "Our architectonic concept of space", reproduced in "Swedish Grace: Modern classicism in Stockholm", *International Architect*, No. 8, vol. 1, Iss.8, 1982.

²⁷ Comment quoted from website: https://wikivisually.com/wiki/Gunnar_Asplund#cite_note-1



Figure 3.5: Woodland Chapel of Stockholm Cemetery. (Source: Hultin Olof & Acking Carl-Alex & Dahlström Rolf, 1997. *Asplund. Corte Madera*, CA: Gingko Press, cop. 1997. ISBN3927258512)

In this project, Asplund kept creating a sense of balance from different aspects. However, this balance consisted rich contexts, which integrated his own inspirations and experience. He looked for harmonies through combining these different elements: classical and local styles, modern and traditional forms, architecture and nature, function and aesthetics. He expected a spiritual feeling of balance and comfort, with strong experience, which was realized by taking care of every detail and their comparisons and integrations.

“Para el sueco, la referencia constante de su arquitectura fue, según él mismo reconoció en diversas ocasiones, las impresiones que recibió en su viaje de post-graduación por los países mediterráneos. Los bocetos de sus cuadernos de viaje dan cuenta de las sensaciones que el paisaje, la gente y sus celebraciones, la comida, la luz, la arquitectura popular, las ruinas clásicas y sobre todo la bóveda celeste nocturna del desierto, tan diferente de su note natal, produjeron en el joven arquitecto. Todos sus proyectos pueden interpretarse como narraciones donde diferentes imágenes y metáforas emergen y definen, en cierto modo el hilo conductor tanto de la concepción general como de los detalles y episodios mas acertados de cada proyecto. Todo ello, por supuesto, unido a una respuesta estricta y eficaz a los requerimientos técnicos y funciones del encargo.” (Luis Bravo and Montserrat Vigas, 2008) ²⁸

Asplund showed his inspiration and love of classical elements which he was impressed in his trip to Italy. Classical elements, as axis, symmetry, dome and columns, could be always seen in his project. When Asplund and his partner Lewerentz designed the Stockholm Cemetery, a new axis was introduced as a continue of the old one, *“In keeping with the burgeoning Neo-classicism of the time, the plan of 1918 imposed a new entry axis that was to remain crucial to the final organization of the whole. It started from the central pedestrian entrance of the older Sandsborg Cemetery opposite, which Lewerentz had been reorganizing.”* (Hultin Olof & Aking Carl-Alex & Dahlström Rolf, 1997) They strengthened the new axis by proposing circular colonnade, which also separated

²⁸ Luis Bravo and Montserrat Vigas, 2008. “Dibujo, imagen y arquitectura. Notas sobre el inicio del proceso gráfico del proyecto en Aalto y Miralles”. *Revista EGA expresión gráfica arquitectónica*, 13/2008. Departamento de Expresión Gráfica Arquitectónica de la U.P.V. La Imprenta, Comunicación Gráfica, SL. ISSN: 1133-6137.

the traffic and walking circulations. This plan reminded the impression of old Rome city: Main constructions were connected by the axis which terminated by a monument construction.

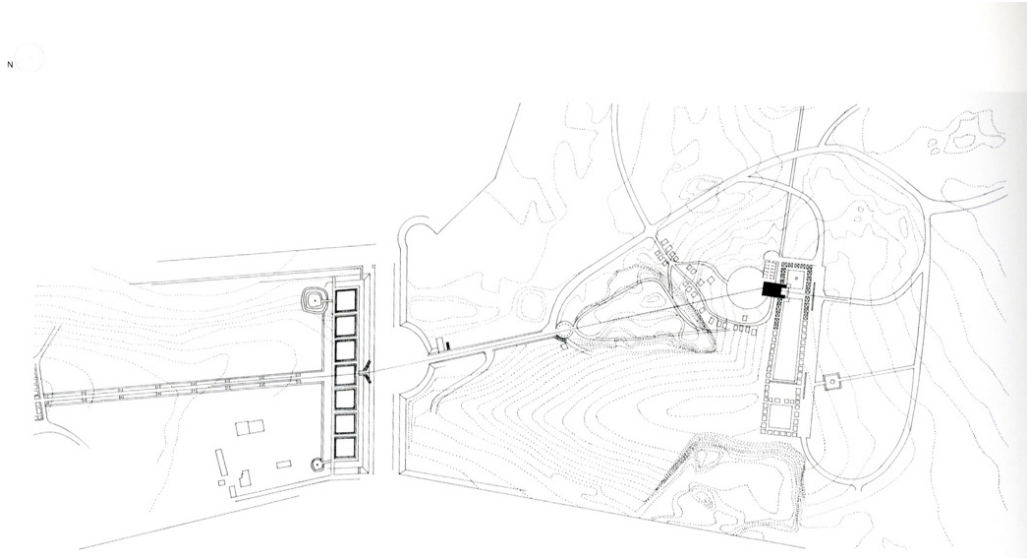


Figure 3.6: Masterplan of Woodland Cemetery, Asplund and Sigurd Lewerentz, 1918-1924. A clear axis was distributed in the project. (Source: Hultin Olof & Aking Carl-Alex & Dahlström Rolf, 1997. *Asplund. Corte Madera, CA: Gingko Press, cop. 1997. ISBN3927258512*)



Figure 3.7: Entrance with classical columns (Source: Hou Yue, 2018. "Being-towards-death – A visit to the Stockholm Cemetery by Asplund." Zhihu blog, 20180114)

Classical elements could be always found here, particularly those classical columns. In Woodland Chapel, wooden Doric columns and dome were re-employed. The dome with a central circular skylight in etched glass made people think of the historic Pantheon. These classical elements brought impressions of sacred and solemn to the small chapel, recalling those durable classical significances. However, these classical elements were re-designed to integrate with local culture and natural landscape, creating a sympathetic harmony. He respected to local elements, like color, material and form. The classical columns were simplified as well as the interior dome. Extra decorations were eliminated, only remaining the basic geometric forms and scales, leaving the classical elements adapted to modern styles and nature. These simple columns responded to the natural pines in the forest. Local clay and wood tiles also showed his respect to local culture and landscape. The exterior appearance of the chapel was designed like a traditional primitive hut, a local house style, bringing a strong local memory.



Figure 3.8: Appearance of Woodland Chapel. (Source: Hou Yue, 2018. "Being-towards-death – A visit to the Stockholm Cemetery by Asplund." Zhihu blog, 20180114)



Figure 3.9: Doric Columns which were simplified to modern and natural style. (Source: Hou Yue, 2018. "Being-towards-death – A visit to the Stockholm Cemetery by Asplund." Zhihu blog, 20180114)

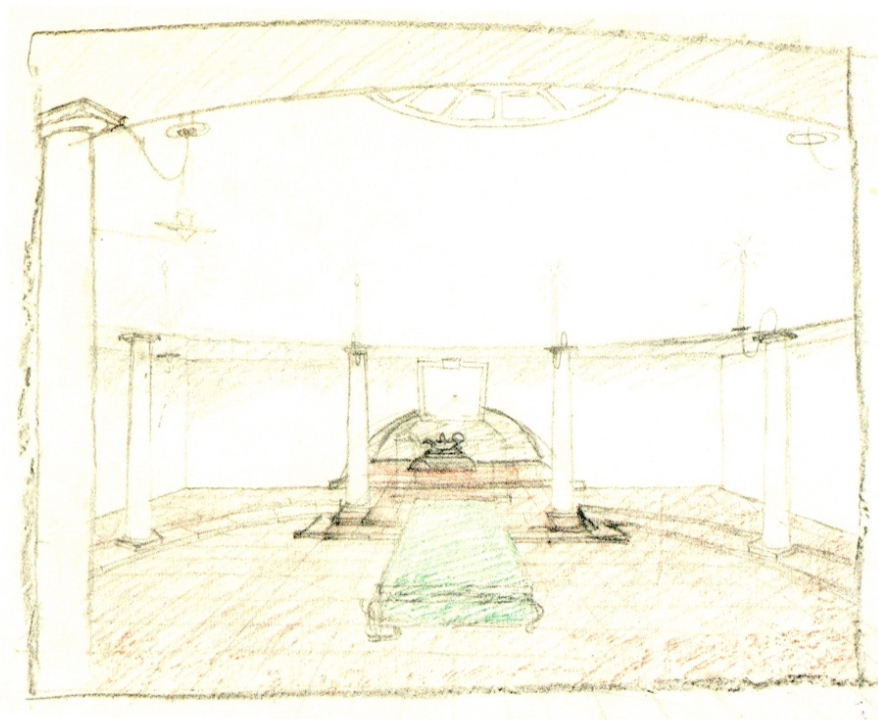


Figure 3.10: Conceptual sketching of interior space. Skylight enter through the central dormer on the dome. (Source: Hultin Olof & Acking Carl-Alex & Dahlström Rolf, 1997. *Asplund*. Corte Madera, CA: Gingko Press, cop. 1997. ISBN3927258512)



Figure 3.11: Pure interior space and dome of woodland chapel. (Source: Hou Yue, 2018. "Being-towards-death – A visit to the Stockholm Cemetery by Asplund." Zhihu blog, 20180114)

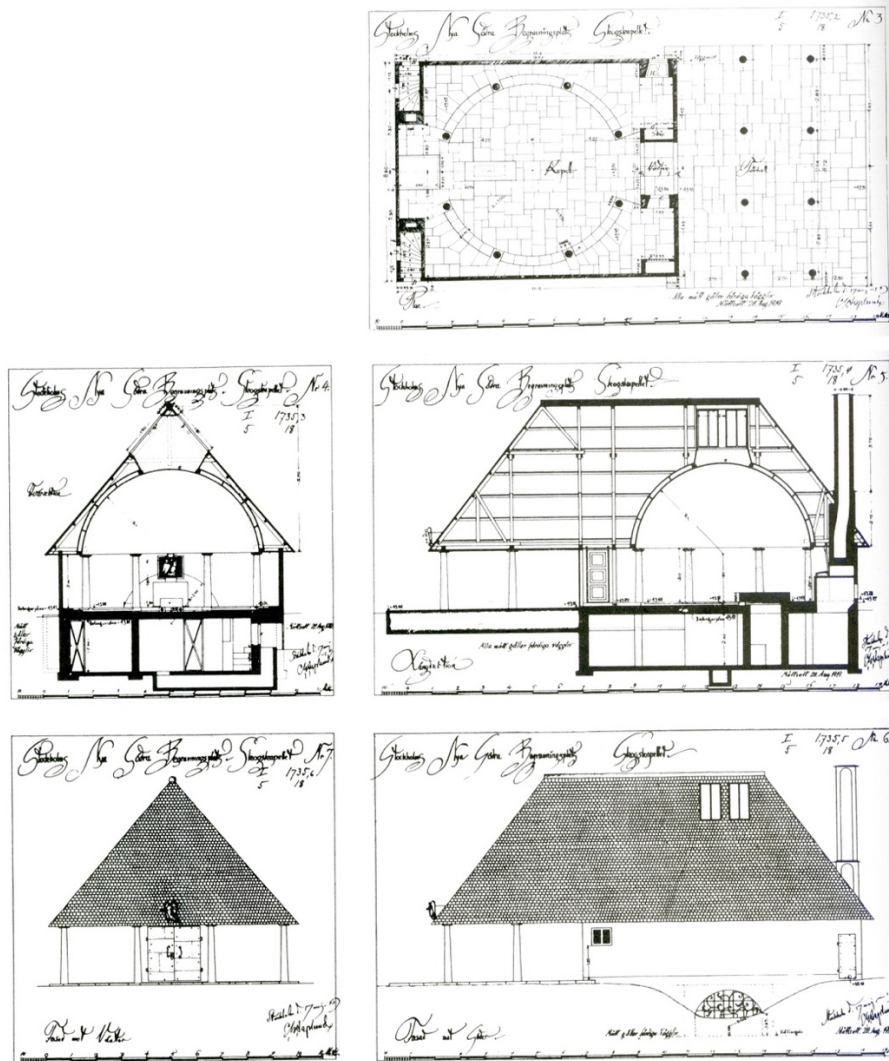


Figure 3.12: Architectural project drawings of woodland chapel. (Source: Hultin Olof & Acking Carl-Alex & Dahlström Rolf, 1997. *Asplund. Corte Madera, CA: Gingko Press, cop. 1997. ISBN3927258512*)

Asplund's architecture has presented rich images associated with his own architectural impressions. But the re-organizations of these complex architectural contexts of classism, modern, nature, culture, tradition, technology and functions have never deviated from a hope of balance, which finally integrated all the strong emotions and experience related to these images to deep tranquility and comfort. Just as his friend Alvar Aalto gloss his concept:

“La contribución de Asplund a las batallas arquitectónicas de nuestra era fue exclusivamente la del arquitecto, no la del dialéctico que es ajeno al arte de la arquitectura. Como muchos de aquellos colegas que compartieron sus objetivos luchó para crear armonía en su trabajo, para atar juntos los hilos de un futuro vivo con aquellos de un pasado vivo. En la creación de formas, el pastiche y las copias fueron tan ajenos a él como el constructivismo tecnocrático y sin raíces. Evitó imitar las formas propias de la arquitectura, lo mismo que rehuyó un árido constructivismo. En su lugar encontró un sendero directo a la naturaleza y su mundo de formas. Recibí una vívida impresión de este aspecto de su trabajo ya la primera vez que conocí a Asplund. Estábamos sentados en el teatro Skandia coloreado de azul añil, pocos días antes de ser terminado. ‘Mientras construía esto, pensaba en los anocheceres de otoño y las hojas amarillas’ dijo Asplund mostrándome el espacio sin límite de la sala con sus lámparas amarillas. Yo tuve la impresión de que aquella era una arquitectura donde los sistemas habituales no habían servido de parámetros. Aquí el punto de partida era el hombre con todos los infinitos matices de su vida emocional y la naturaleza...

Los motivos de una gran proporción de nuestra arquitectura convencional son aún fragmentos de una era pasada. Otra arquitectura ha llegado que construye para el hombre y considera esencialmente a la gente como un fenómeno social, mientras al mismo tiempo toma la ciencia y la investigación como punto de partida. Pero más allá todavía, una arquitectura más nueva ha hecho su aparición; una que continúa utilizando las herramientas de las ciencias sociales pero que incluye también el estudio de los problemas psicológicos – la naturaleza desconocida del hombre – en su totalidad. Está última ha probado que el arte de la arquitectura continúa teniendo recursos inagotables y medios que fluyen directamente de la naturaleza y de las inexplicables reacciones de las emociones

humanas. Dentro de esta última arquitectura Asplund tiene su sitio.” ²⁹ (Luis Bravo and Montserrat Vigas, 2008)



Figure 3.13: Axis accompanied with nature terminating in little chapel to the end. Architecture elements and nature all stay in harmony. (Source: photo by Landezine. Landezine Newsletter.)

²⁹ Alvar Aalto: op.cit. p334

3.2. Luis Kahn

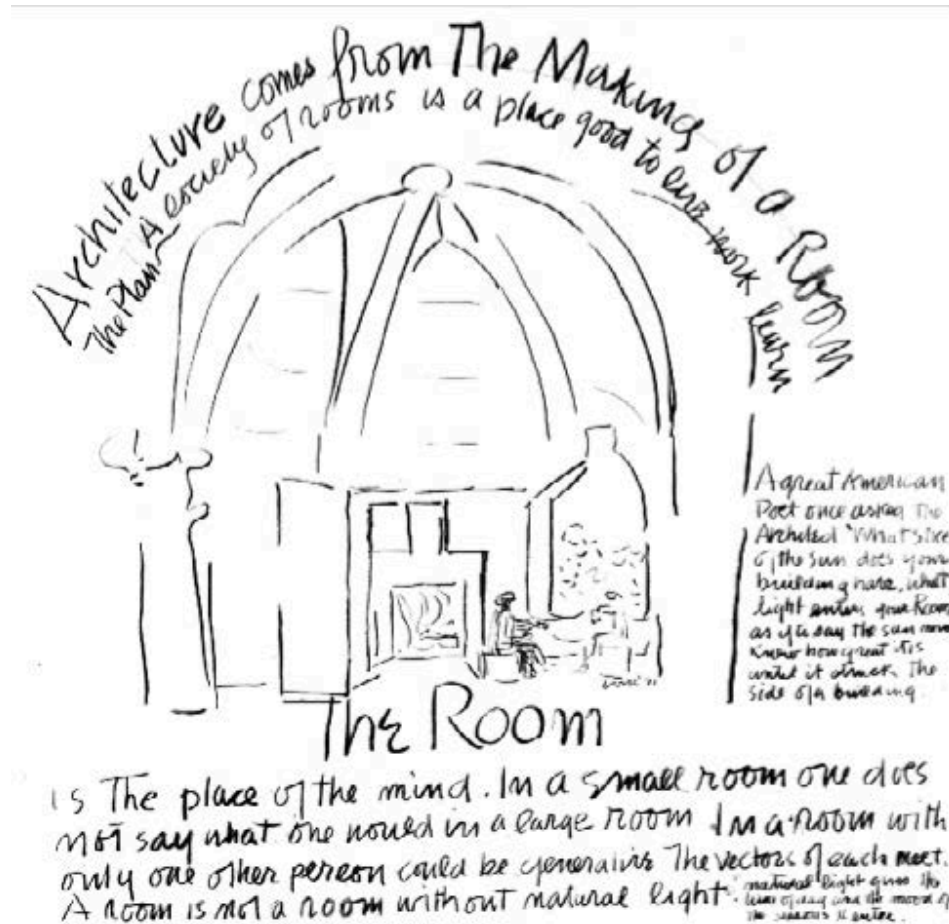


Figure 3.14: L. Kahn, drawing for City/2 exposition: The Room, 1971. Louis I. Kahn Collection. (Source: Noelia Galván Desvaux and Antonio Álvaro Tordesillas, 2017. *Louis Kahn, the Beginning of Architecture. Notes on Silence and Light*. Disegno, 2017, 1, p90.)

“The room is the beginning of architecture. It is the place of the mind. You in the room with its dimensions, its structure, its light responds to its character, its spiritual aura, recognizing that whatever the human proposes and makes becomes a life.”

----- *Louis I Kahn, speech of “The room, the Street and Human Agreement.*

The nature of Architecture and original emotional desire

After Heidegger talking about presence and its meaning, phenomenology has spread widely in architecture field. Architectural origins and nature were gradually concerned by human society. Architecture, rather than a physical object, is a social result linked with human's activities and desires. Architects started to notice and strengthen relations between space and human's spiritual world in their architecture practice. Undoubtedly, Louis I Kahn was a representative practitioner. In Kahn's life as an architect, he was always trying to search and express the origin and nature of architecture. He always believed that architecture emerged and existed in a form because of human's original desires, not a basic requirement for functions, but a deeply emotional or spiritual hope. *"It is ever a wonder when man aspires to go beyond the functional. Here was the will to build a vaulted structure 100 feet high in which men could bathe. Eight feet would have sufficed. Now, even as a ruin, it is a marvel"*³⁰ (David B. Brownlee, David G. De Long and Vincent Scully, 1991.p 50). Egyptian pyramids, when we left those incredible technology and materials and came back to the origin, they reflected an expect of remark. These legendary architecture of ancient Rome and ancient Egypt was born because of human's emotional desire, not simple function need. Architecture, to the origin, is a result of emotional and spiritual will.

On this point, Kahn always tried to find original aspiration in his projects. He thought architecture couldn't be started without knowing "what it wanted to be". The original emotional will is an essence of architecture and should be inherited in architectural space. *"It is the duty of the architect to find what is the thoughtful realm of space... not just take the program of the institution but try to develop something which the institution itself can realize is valid"*³¹ *"I never read a program literally... It is like writing to Picasso and saying, 'I want my portrait painted--- I want two eyes in it --- and one nose --- and only one mouth, please.' You can't do that, because you're talking about the artist."*³² When he started his famous projects Salk Institute, those function programs didn't be thought first.

³⁰ Kahn, quoted in Ada Louise Huxtable, "What is Your Favorite Building," New York Times Magazine, May 21, 1961; filed in "Misc.," Box LIK 64, Kahn Collection.

³¹ Kahn, quoted in "On Philosophical horizons" (panel discussion), *AIA Journal* 33(June 1960):100.

³² Kahn, "Louis I. Kahn: Talks with Students," *Architecture at Rice*, no. 26 (1969): 26-27.

His project started when his client John Salk talked to him his emotional hope that he wanted invite Picasso to his laboratory.

“Architecture is not conceived or born when we ask how to construct it but when we explore what it is that it looks to express; it is more to do with discovering what according to Kahn has been forgotten, the primordial order that exists, this order that already ‘is’, that is immaterial, pure creative force and inclusive will.”³³

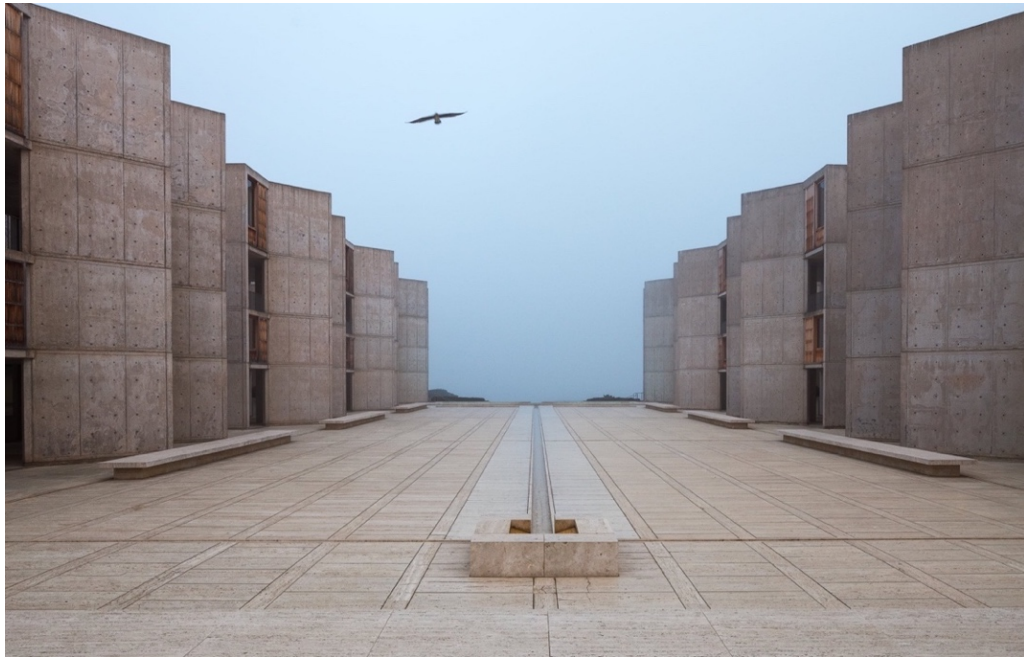


Figure 3.15: Salk Institute, Louis i Kahn, 1965. (Source: Photo by Leonid Furmansky)

Form and design ---- From unmeasurable to measurable

Human's emotion and desire give the original form to architecture. As Kahn always mentioned: *“Schools began with a man under a tree, who did not know he was a teacher, discussing his realizations with a few others, who did not know they were students. The students reflected on the exchanges between them and on how good it was to be in the presence of this man. They wished their sons, also, to listen to such a man. Soon, the needed spaces were erected and the first schools came into existence. The establishment of schools was inevitable because they are*

³³ Noelia Galván Desvaux and Antonio Álvaro Tordesillas, 2017. Louis Kahn, the Beginning of Architecture. Notes on Silence and Light. *Diségno*, 2017, 1, p85.

part of the desires of man."³⁴ (David B. Brownlee, David G. De Long and Vincent Scully, 1991.p 94) ³⁵ For Kahn, architecture comes from humanity. Architecture has its form when human generates some desire. Architects should firstly come back to think the origins which could be discovered in history, culture and memories.

New architecture creation is a process of discovering its original form which contains the nature and first emotional wish and re-expressing it in a new way. Design is to find a way of re-expressing the emotional will adapted to new social orders. It is a way to transform all the unmeasurable desires and emotions to a measurable method.

"Form is what, Design is how. Form is impersonal, design belongs to its producer. Design is a circumstantial event (the available budget, the plot, the client, the knowledge needed); Form has nothing to do with all these circumstantial conditions. In architectural terms, Form describes a harmony of spaces suitable for a specific human activity" (Kahn 1962, p. 115)³⁶.

Discovery of form and re-expression by design together create architecture. Form and design are both reflecting and passing an emotional will to modern society.

*"Form reflects the will to be, linked to human thought, philosophy, and, especially, to history. This is a look back to the beginnings and the deep searching through memories which are defined by archetypes. In addition to this, design is the will to express, related to feelings, and the need for translating all mental images of inspiration into reality."*³⁷

³⁴ Kahn, lecture recorded November 19, 1960, and broadcast November 21, 1960; published as Structure and Form, Forum Architecture Series, no. 6 (Washington, D.C.: Voice of America, [1961]), 2. The tree metaphor was introduced at least as early as 1955; see Kahn, review of *Synagogue Architecture in the U.S.*, by Rachel Wischnitzer, MS, ca. November 1955, "Descriptions of Building," Box LIK 54, Kahn Collection.

³⁵ David B. Brownlee, David G. De Long and Vincent Scully. 1991. *Louis I Kahn: in the realm of architecture*. Rizzoli International Publications, INC.

³⁶ Kahn, L. (1962). Form and Design. En Scully, V. Louis I. Kahn, pp. 114-121. New York: George Braziler.

³⁷ Noelia Galván Desvaux and Antonio Álvaro Tordesillas, 2017. Louis Kahn, the Beginning of Architecture. Notes on Silence and Light. *Diségno*, 2017, 1, p85.

Architectural space is a place to pass the emotions. Inheriting original emotional desire gives architecture its soul. Design, the wish of expression, is to give architecture its presence which makes all the unmeasurable emotions contained in architecture be precepted and felt by people in a measurable way.

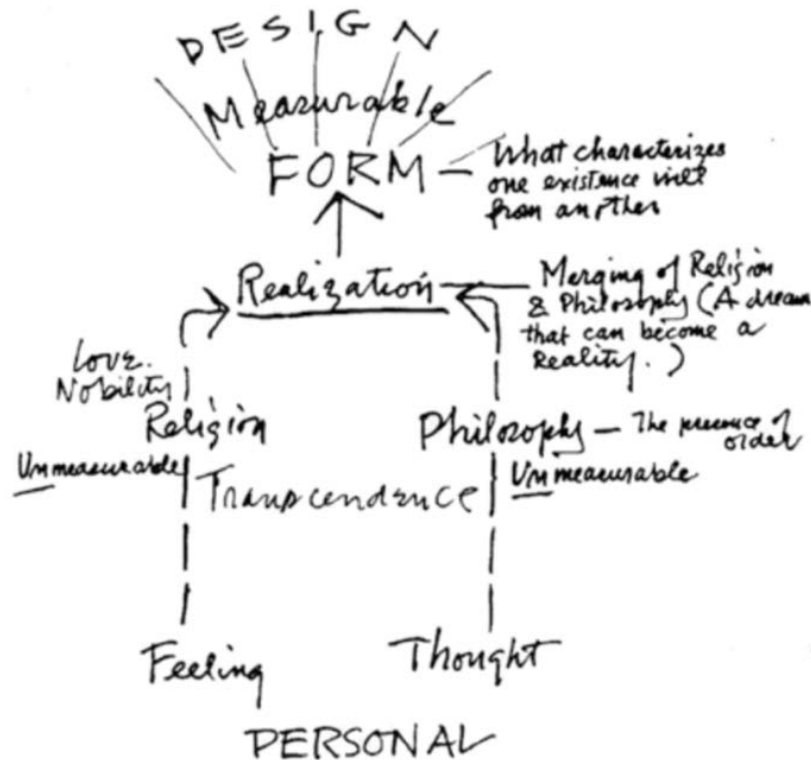


Figure 3.16: L. Kahn, on the creation of Form, 1960. (Source: Tyng, A. (1984). *Beginnings: Louis I. Kahn's philosophy of architecture*, p. 30. New York: Wiley.)

Kahn's project the library for Phillips Exeter Academy has clearly shown his idea. He was trying to interpret the original emotional desire and spirit of library form from his architecture shapes.

*"There, upon a simple plan, he erected a great spiritually with light. Functionally a library, it was spiritually a sanctuary. Kahn had always loved books, browsing in bookshops, paging through volumes, and buying books with unaffected reverence, but, as he freely admitted, rarely reading more than the first pages of anything. A book was therefore not an ordinary useful object. "A book is tremendously important," he told a design conference at Aspen in 1972. 'Nobody ever paid for the price of a book, they pay only for the printing. But a book is actually an offering and must be regarded as such. If you give honor to the man who writes it, there is something in that which further induces the expressive powers of writing.'*³⁸ *A library was therefore a place of piety."* (David B. Brownlee, David G. De Long and Vincent Scully, 1991.p 124)

Kahn had his first idea from the exploration of emotional wish and spiritual nature of library. He commented that library came from the spiritual hope that a man with a book went to the light. He had interpreted this emotional meaning in his architecture. It is a space illuminated and sacred that gives people a pure emotional experience and makes them feel the original desire of library.

³⁸ Kahn, "I Love Beginnings" (lecture, International Design Conference, "The Invisible City," Aspen, Colorado, June 19, 1972), *Architecture + Urbanism*, special issue "Louis I. Kahn," 1975, 283-84.



Figures 3.17& 3.18: L. Kahn, Exeter Library, 1972. (Source: Wiggins, Glenn E, 1997. *Louis I. Kahn: the library at Phillips Exeter Academy*. Wiley; 1st edition May 7, 1997. ISBN-13: 978-0471288312)

Material and structure for emotional expression

Material and structure, for Kahn, have their sense and should be presented in an expectable way related to the original desire of architecture. Material and structure are created by as well as representing human's aspiration. As said in the talks with bricks, one of his most famous words:

"You say to a brick, 'What do you want, brick?' And brick says to you, 'I like an arch.' And you say to brick, 'Look, I want one, too, but arches are expensive and I can use a concrete lintel.' And then you say: 'What do you think of that, brick?' Brick says: 'I like an arch.'" ---- Louis I Kahn

Kahn loved to present the nature of material and structure. He thought it was a way to discover the nature of architecture. This idea made Kahn's architecture always a whole which completely interpreted in every aspect the original emotion of what architecture wanted to be. Compared with others, Kahn's architecture has neither showed high tech nor luxury appearance. He just presented his architecture its nature in a most reasonable and complete way. Just because this, Kahn's architecture is always showing a deep and pure affection.

Whether project Salk or Exeter library, pure concrete was used directly and those structural elements to connect the concrete block were visible. Kahn thought that these structural elements were parts of architectural life which showed how architecture live and work. In the top of central patio of Exeter library, the big concrete cross beam could be seen, which divided and reflected the entering light. Structural characteristics have been clearly shown by light rendering which clearly impressed the presence of architecture on people's mind. In this way, the nature of architecture has been shown completely rather than hidden behind the luxury appearance. Kahn didn't show architecture in luxury ways with high-tech or brilliant shapes. Instead, he just did in a most pure and thoughtful way to fully express the original emotion and nature of architecture, to create a most humanistic experience to people.

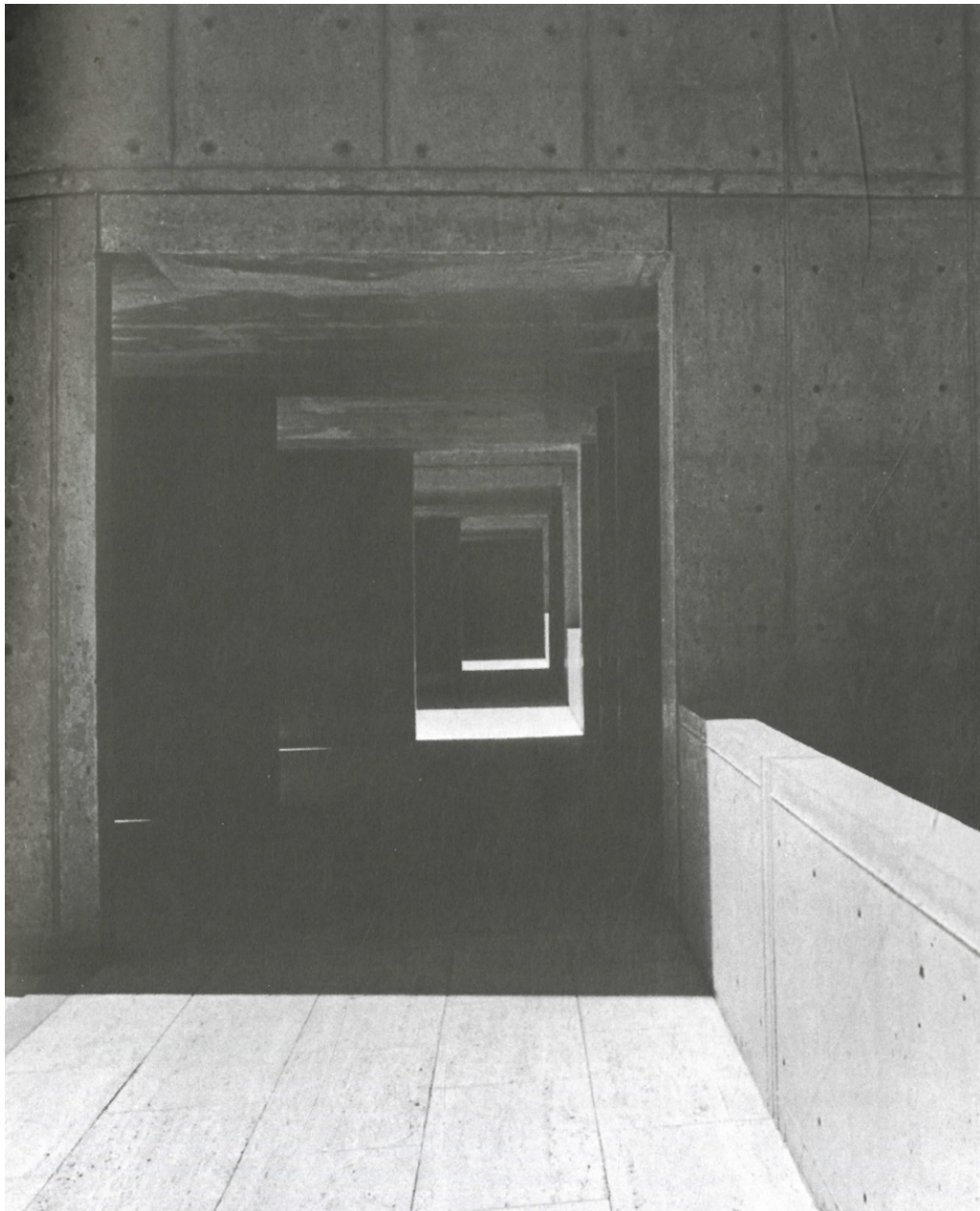


Figure 3.19: Pure concrete wall. Structural elements are visible. Salk Institute, Louis i Kahn, 1965. (Source: John Lobell, 1979. *Between Silence and Light: Spirit in the Architecture of Louis I. Kahn*. Shambhala Publications, Inc, 2008. ISBN:9781590306048)

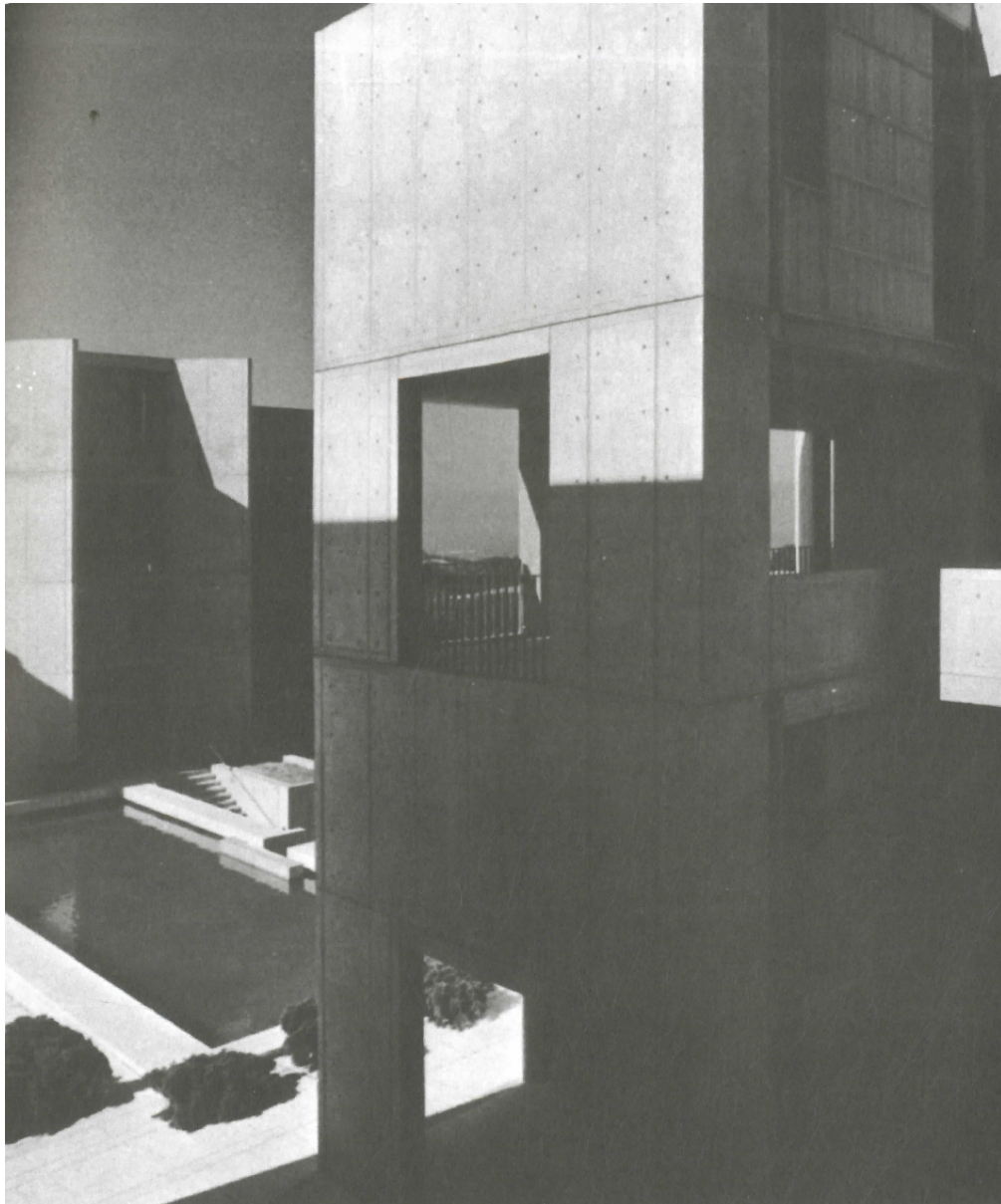


Figure 3.20: Pure concrete wall. Structural elements are visible. Salk Institute, Louis i Kahn, 1965. (Source: John Lobell, 1979. *Between Silence and Light: Spirit in the Architecture of Louis I.Kahn*. Shambhala Publications, Inc, 2008. ISBN:9781590306048)



Figure 3.21: Pure concrete wall of Exeter Library. Big concrete cross beam divides the lights. The space is presented in a pure and thoughtful way. People can strongly feel the original emotion and nature of library. L.Kahn, Exeter Library, 1972. (Source: “Mi Arquitecto: El Viaje De Un Hijo.” Bitácora Universitaria de un Arquitecto.)

Inspirations from traditional symbols for emotional expression

Kahn was always inspired from tradition. On his trip to Egypt, Rome and Greece, those ancient buildings have affected a lot on Kahn's mind. Ancient architectural shapes were always strongly showing human's original desire by their clearly rhythms, geometries, proportions and scales. They gave people strong emotional intimations. Kahn had inherited these emotional intimations in his projects. Geometries as circles and triangles could be always seen in Kahn's works. Facade rhythms and proportions have also shown strong respect to the ancient architecture.

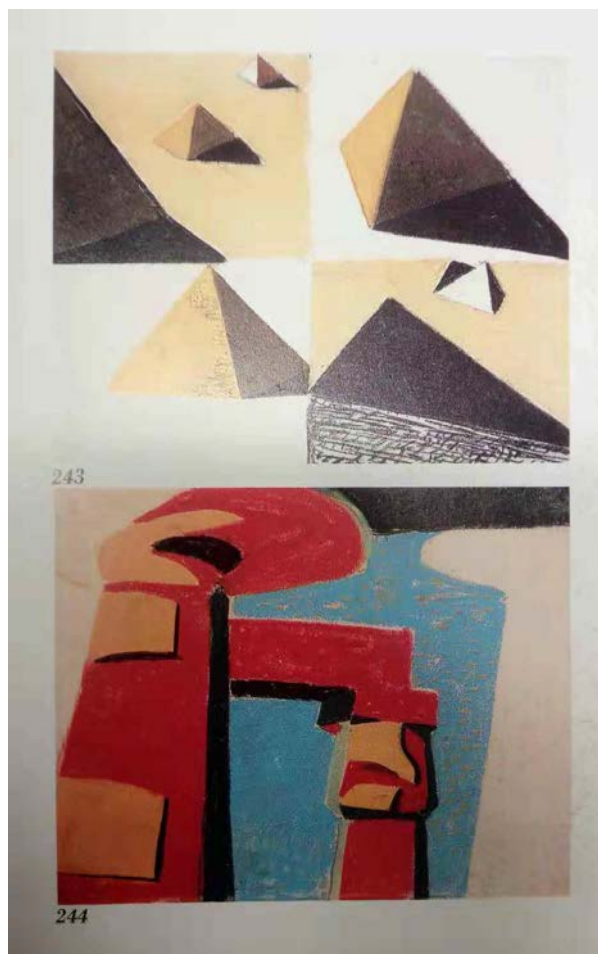


Figure 3.22: Kahn's drawing notes of the symbols extracting from ancient architecture, which he thought were strong emotional intimations. (Source: David B. Brownlee, David G. De Long and Vincent Scully. 1991. *Louis i Kahn: in the realm of architecture*. Rizzoli International Publications, INC.)

Meaning of light in architecture expression

"The room is the beginning of architecture." "A room is not a room without light". Said Louis I Kahn in his speech of "The room, the Street and Human Agreement", which was also noted on his drawing of *"The room"*³⁹.

For Kahn, light is the giver of presences for architecture. He liked to use silence and light to describe his understanding of architecture process and relation between form and design. *"By the late sixties Kahn had come upon a favorite formulation that was more mysterious: silence and light. In November 1967, in what may have been his first public explanation of these newest terms, he told a Boston audience that architecture was created at a point that lay between a silent ideal and the illumination of the real, a place that he called 'the threshold where Silence and Light meet, Silence with its desire to be, and Light, the giver of all presences.' (...) Silence was the realm of ideal truth which had existed even before the pyramids had been built --- 'before the first stone was laid.' Light, on the other hand, was the energy of the real: 'I sense Light as the giver of all presences, and material as spent Light. What is made by Light casts a shadow, and the shadow belongs to Light. I sense a Threshold: Light to Silence, Silence to Light -- an ambiance of inspiration, in which the desire to be, to express crosses with the possible.'*⁴⁰ " (David B. Brownlee, David G. De Long and Vincent Scully, 1991, p128)

Light for Kahn, is not only a poetic description for design, but also a real key of architecture. Light creates a life of architecture. *"He had long assigned light a key role in the making of architecture, maintaining that 'no space is really an architectural space unless it has natural light.'*⁴¹" (David B. Brownlee, David G. De Long and Vincent Scully, 1991, p128)

For this, Kahn paid special attention to natural light in his projects. He liked expressing the structures and colors of light as well as its interactions with

³⁹ The Room, 1971. Louis I. Kahn Collection. Shown on City/2 exposition.

⁴⁰ Kahn, "Architecture: Silence and Light" (lecture, Solomon R. Guggenheim Museum, December 3, 1968), in Guggenheim Museum, *On the Future of Art* (New York: Viking Press, 1970), 21.

⁴¹ Kahn, "Talk at the Conclusion of the Otterlo Congress," in *New Frontiers in Architecture: C.I.A.M. '59 in Otterlo*, ed. Oscar Newman (New York: Universe Books, 1961), 210.

tangible architectural elements, in order to render space emotional ambience. In Kimbell museum, construction elements disperse and reflect light beams to draw rich light structure graphics in the space. The light graphics are changing over time, which makes the space more active. Light has given the space presence which could be felt, be precepted and interact with people's mind. Existed original desire has been presented with life. Architecture has a natural life with emotion, rather than a cold object that never changes. What's more, he thought natural light had colors. The color of light creates a deepest rendering on architectural elements and gives people a pure and vivid experience about colors and materials, which also enforces their affection on mind.

"The magenta sunset gave you an inky green—it wasn't just an ordinary green. The green was so green that I had to feel that [it] wasn't paint; and on the shadow of my hands was also green, that's how green it was. And that cast a shadow on the stones, which were a golden color, and this green cast itself a purple shadow, because it had so much light in the green. So, within iridescent stone there was a shadow caused by the green shadow on the stone itself, and that really set me off because I thought I could independently paint all of these things" (conversation with Jan Hochstim, 1972).

By light, architecture space is no longer a dark object, but one has colorful life developing within time. It brings the original desire to present, creating spiritual communications with people. With this concept, in Kimbell Art museum, series investigations were realized on structure shapes and materials to find way to reflect natural lights, making people always feel the interactions with time and natural colors. As Kahn said:

"Here I felt that the light in the rooms structured in concrete will have the luminosity of silver. I know that rooms for the paintings and objects that fade should only most modestly be given natural light. The scheme of enclosure of the museum is a succession of cycloid vaults each of a single span 150 feet long and 20 feet wide, each forming the rooms with a narrow slit to the sky, with a mirrored glass shaped to spread natural light on the sides of the vault This light will give a touch of silver to the room without touching the objects directly, yet give the

comforting feeling of knowing the time of day. Added to the skylight from the slit over the exhibit rooms, I cut across the vaults, at a right angle, a counterpoint of courts, open to the sky, of calculated dimensions and character, making them Green Court, Yellow Court, Blue Court, named for the kind of light that I anticipate their proportions, their foliation, or the sky reflections on surfaces, or on water, will give.”⁴²

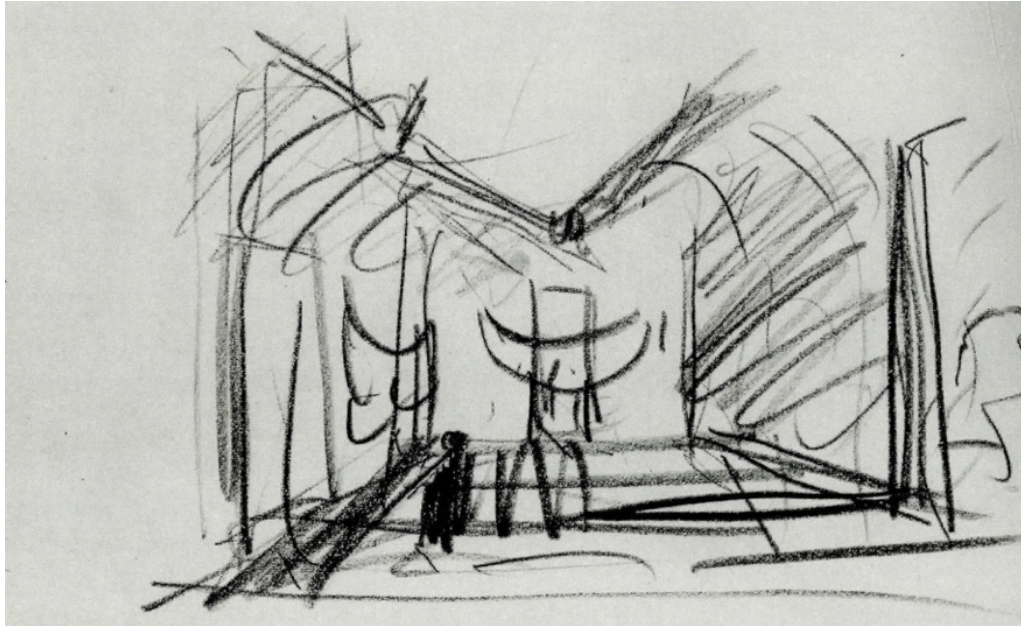


Figure 3.23: Kahn's conceptual sketch of Light design in Kimbell Art Museum. Perspective of Gallery interior. Lights are separated and reflected by structures and walls, always making people feel the presence of space interacted with time and nature. (Source: Patricia Cummings Loud, 1989. *The Art Museums of Louis I. Kahn*. Duke University Press in association with the Duke University Museum of Art. ISBN:082230998X.)

⁴² Kahn described the evolving Kimbell Museum in a talk delivered at the New England Conservatory of Music in Boston in November of 1967.

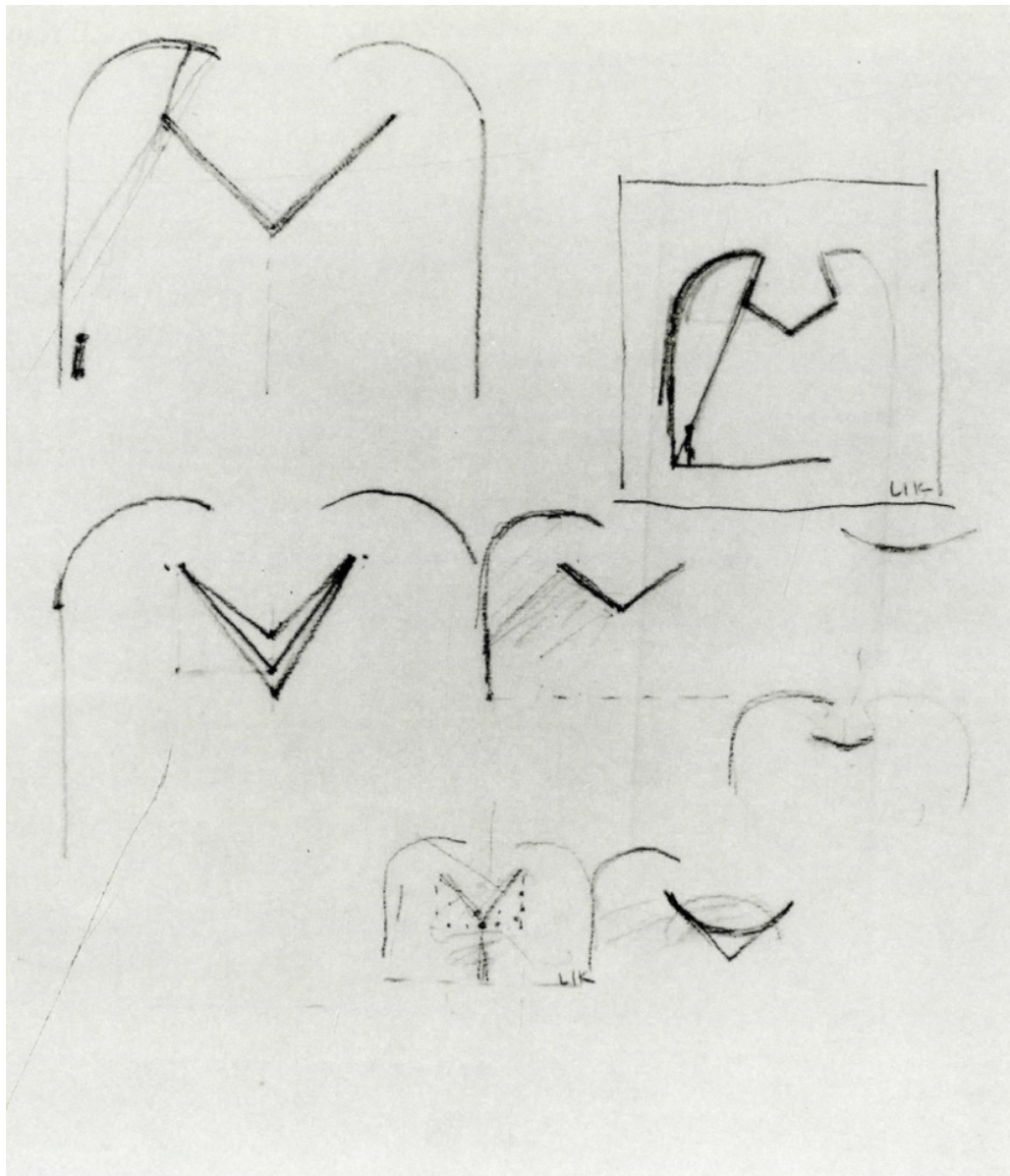


Figure 3.24: Kahn's exploration of light reflecting by structures. The interior reflectors or light shields whose purpose was to deflect direct light were conceived as part of the skylight. They grew in importance, evolving into a three-dimensional shape that would elicit a sense of a lowered ceiling and more intimate space while at same time reflecting light onto the walls. (Source: Patricia Cummings Loud, 1989. *The Art Museums of Louis I. Kahn*. Duke University Press in association with the Duke University Museum of Art. ISBN:082230998X.)

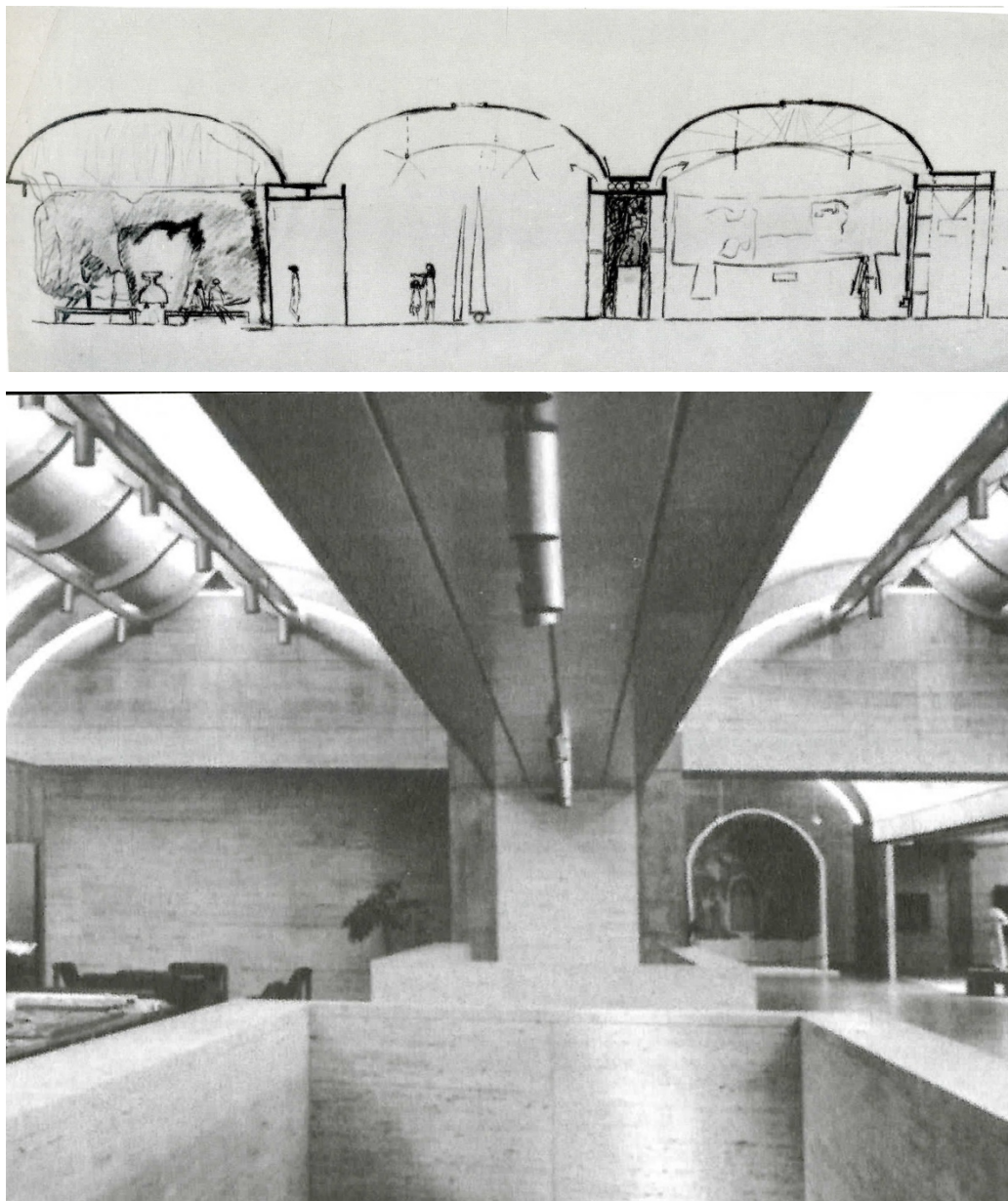


Figure 3.25: Interactions between light and vaults. (Source: Patricia Cummings Loud, 1989. *The Art Museums of Louis I. Kahn*. Duke University Press in association with the Duke University Museum of Art. ISBN:082230998X.)

To conclude, Kahn treated architecture as a result of humanistic activities and desires. Human's emotional desire gives the birth of architecture. Design is to look for measurable elements as shapes, materials, colors to carry these emotions and finally pass it back to people's mind. It is transmission and communication of emotions.

“A great building must begin with the unmeasurable, must go through measurable means when it is being designed and, in the end, must be unmeasurable.” ----- Louis I Kahn



Figure 3.26: Louis Kahn in the Yale University Art Gallery, 1953. (Source: Courtesy of Lionel Freedman Archives)

3.3. Tadao Ando

As Louis I Kahn treating light as a giver of architecture's life, Tadao Ando, a famous Japanese architect, also used light as a key point of architecture emotional creation. He is good at using light to draw on its pure architecture appearance to create an emotional connection with human's perceptions of art, philosophy, belief and culture. Ando's architecture always has a simple and pure form. Architecture creation, for Ando, is to enlighten people and enable them to understand the potential meaning, revealing a state of awareness.

“Tadao Ando enables people to relate to his emotional design situation that reflects the Zen state of mind inherent in traditional Japanese culture, which is characterized as being quiet, distant, clear, and poetic. In this study, literature reviews and field investigations have been used to observe and analyze the detail composition syntax created in Tadao Ando's spatial situation for summarizing the composing mode and design method of its detail aesthetics.” (Hao-Long Hsu, Yu-Li Chang, and Hsiu-Hui Lin, 2015)⁴³

In Ando's most famous project Church of the Light, a great cruciform is cut into the thick concrete wall. It's very interesting that he didn't use the real cruciform but one made by light. As we know, there are always general emotional requirements for church space. Church should provide a sacred and serene space to remind human's respects to the God. At the same time, it is also a place to provide solemn and hopeful experience, with purpose of making people feel close to the God. The high pointed towers and colorful windows in ancient gothic churches are good proofs of this common emotional requirements.

In Ando's project Church of light, the pure material and considerations of natural light have successfully interacted and touched people's minds. The appearance of the space has presented a pure, simple and contemporary atmosphere

⁴³ Hao-Long Hsu, Yu-Li Chang, and Hsiu-Hui Lin, 2015. “Emotional Architecture - A Study of Tadao Ando's Genius Loci Design Philosophy and Design Syntax.” *International Journal of Chemical, Environmental & Biological Sciences (IJCEBS)* Volume 3, Issue 6 (2015) ISSN 2320-4087 (Online)

accompanied with impressive comparisons. The fantastic light cruciform has been cut into the thick solid wall, creating strong comparisons between virtual and real, dark and bright, which emphasizes the space affections and emotional reflections. When morning comes, pure light illuminates the great cruciform and projects on the benches which are located in the dark enclosed space. People can immerse in the pure solemn light coming from the sky, which illuminates the dark space as well as their heart. This emotional experience has made the original yearning for hallow and tranquility to be presented in contemporary space.



Figure 3.27: The church of light, Tadao Ando, Japan, 1989. (Source: Kenneth Frampton, 2003. *Tadao Ando: Light and Water*. Monacelli, 2003. ISBN: 1580931138)



Figure 3.28: The church of light, Tadao Ando, Japan, 1989. (Source: Kenneth Frampton, 2003. *Tadao Ando: Light and Water*. Monacelli, 2003. ISBN: 1580931138)

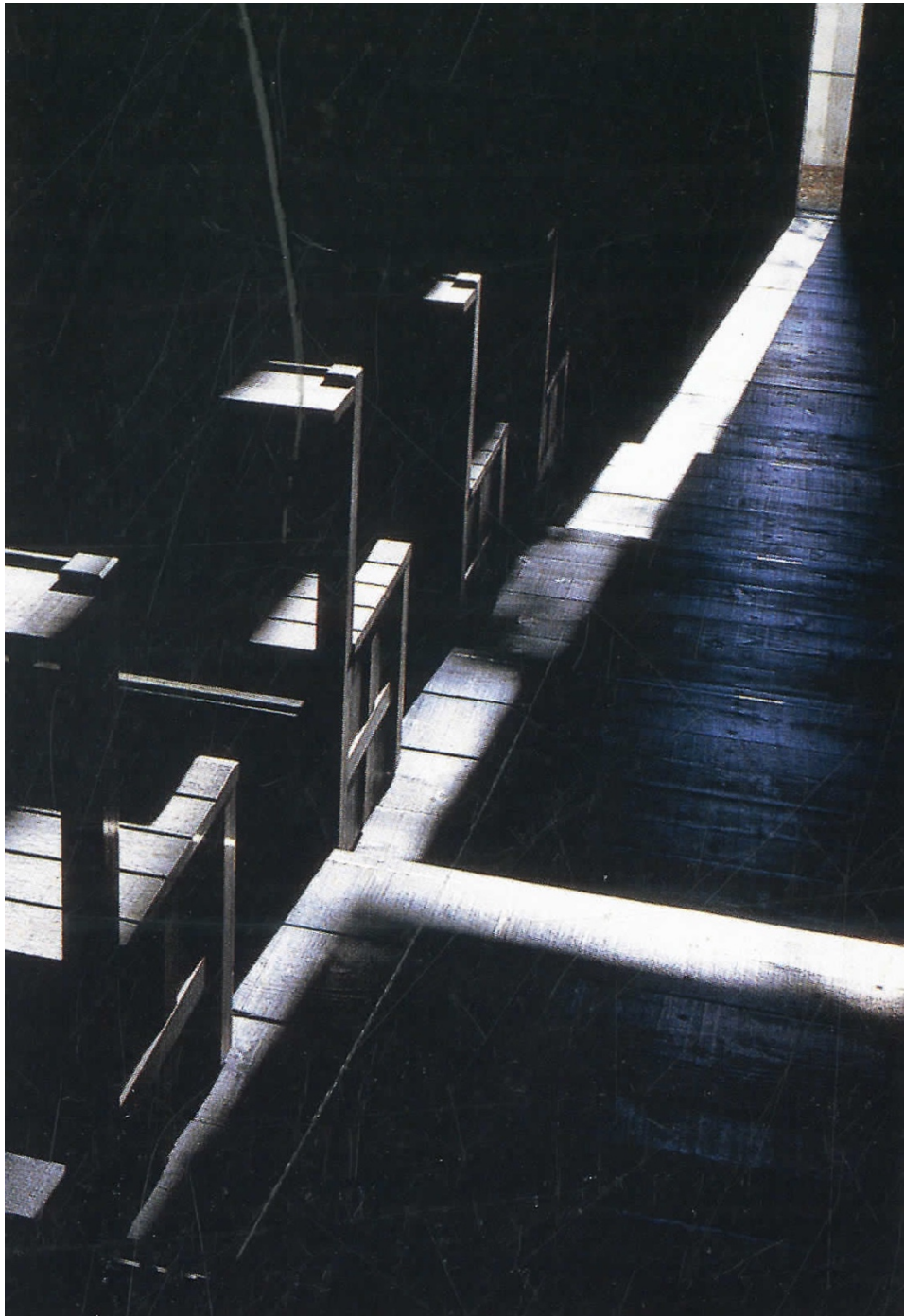


Figure 3.29: The church of light, Tadao Ando, Japan, 1989. (Source: Kenneth Frampton, 2003. *Tadao Ando: Light and Water*. Monacelli, 2003. ISBN: 1580931138)

3.4. Zumthor's Architecture atmosphere theory and space emotion creation

Contemporarily, Peter Zumthor has made great contribution to architecture emotional design, both in theory and practice. Rooted in phenomenology theory, Peter Zumthor treated human body as the measure of architecture and human's feelings decide directly architectural qualities. Architecture with good qualities should create an experience, or an atmosphere, in his words, which is associated with human's perceptions and brings some affections to human's minds. Based on these concepts, he systematic summarized the atmosphere creation theories and methods in his book "ATMOSPHERE"⁴⁴. Peter Zumthor constitutes architectural atmospheres as:

"this singular density and mood, this feeling of presence, well-being, harmony, beauty...under whose spell I experience what I otherwise would not experience in precisely this way" (Zumthor, 2006).

In his book, he has put forward nine aspects that would affect the architecture atmosphere associated with human's feeling and emotional needs. He said that architecture atmosphere was helpful to give a high spirit quality to architecture and made architecture closer to human's mind. He also reminded architects to pay attention to aspects that were easily ignored in space design, as sound and temperature, which could affect a lot people's feeling. People's emotion is very complex and may be affected by every small element of architecture. Architects should consider these influences and choose the right elements to create an expected atmosphere.

Zumthor's theory has already been practiced in his projects. In the Therme Vals, he expressed architecture emotions through every small architectural aspect.

⁴⁴ Peter Zumthor, 2006. Atmosphere. Birkhauser, Basel, Switzerland.



Figure 3.30: interior space of Therme Vals, Peter Zumthor, 1994. (Source: Zumthor Peter, 2006. *Atmosphere – Architectural environments – Surrounding objects*. Basel-Boston- Berlin, Birkhauser, 2006. ISBN-10: 3764374950)

From architecture form and material

As doing Louis I Kahn, in the start of this project Peter Zumthor looked for the origins and the nature of bathing house as well as local architecture. Inspired from surrounding environment, Zumthor wanted to inherit the sense of bathing rituals and original memories of local architecture in his project and give them contemporary meanings. *“This architectural design work has meant always think bathing rituals. The Architecture that we have developed step by step inspired us to see the bathing experience in a new light, to find new options and ways to let go of some things to rediscover the original forms.”*⁴⁵



Figure 3.31: Conceptual sketch of form, Peter Zumthor. (Source: Zumthor Peter, 2006. *Atmosphere – Architectural environments – Surrounding objects*. Basel-Boston- Berlin, Birkhauser, 2006. ISBN-10: 3764374950)

His conceptual sketch of form showed a series of comparisons between darkness and illumination, heavy and lightweight, reality and virtuality, which were introduced to create an expected atmosphere.

Inspired from cave and culture, local gneiss stone was chosen as the main material. It was helpful to create an atmosphere of mystical, dark, natural and quiet. When light came into the space, expected comparisons would be strongly felt by people, which further gave them a complete experience of rituals. On the

⁴⁵ Zumthor's description about the design concept of Therme Vals project. Quotes from website wikiarquitectura <https://en.wikiarquitectura.com/building/thermas-vals/>

other hand, gneiss stone was also a carrier of local memories. Zumthor cut big gneiss stone into pieces and combined these pieces in a new order, which showed better the characteristics of this natural local material. This material, which was always used in the traditional old buildings, is a symbol of local culture and history. It expresses strong respects to local characteristics, which would interact with people's memories. This material contains the experience of local people and shows their own thoughts about the relationship between architecture and environment. With this material, Zumthor has kept essence of local memories in his building. When people here, they will easily remember the historic buildings in their memory, which will call up their nostalgia.

Besides, this material also creates an atmosphere of nature. Stones work together with the spring, creating a natural feeling as a cave in mountain, which reminds the original form of bathhouse. He has created an experience and emotional connection between now and past as well as architecture presence and the nature.



Figure 3.32: Therme Vals, Peter Zumthor, 1994. (Source: Zumthor Peter, 2006. *Atmosphere – Architectural environments – Surrounding objects*. Basel-Boston- Berlin, Birkhauser, 2006. ISBN-10: 3764374950)



Figure 3.33: Local gneiss of Therme Vals, Peter Zumthor, 1994. (Source: Zumthor Peter, 2006. *Atmosphere – Architectural environments – Surrounding objects*. Basel-Boston- Berlin, Birkhauser, 2006. ISBN-10: 3764374950)

From the human's perception of the space

In Zumthor's theory, atmosphere has been created by stimulus that real architectural elements work on people's sensory system. Sound, temperature, light, smell and tactile impression all can affect people's feeling. In the Thermal Vals, different colors of lights were used to create different atmospheres. In the spa area, cold colors were used to create a quiet and refreshing atmosphere. The colors contained in the light are separated by water reflections, which create varies light effects. The halo and gradient of light have created a fantastic atmosphere. The water vapor in the bath area has emphasized this fantastic effect, which makes the space like a fairyland.

Zumthor also valued a lot the effect of natural light. He remained some slits between the roof and the wall, through which natural light could enter. Natural light makes the interior space connect with the outside and creates a strong comparison in the dark place. Interactions between natural light and time have brought the whole space from silence to presence. What's more, natural light

entered through the narrow slits, rendering the top parts of the wall and making the texture clearer. These natural light beams had their own structures limited by the slit and changed in each part. Different light compositions interacted with time and configured the silent dark space with rich experience.

Sound is also an important factor to strengthen the feeling. Water hit the rough stonewalls creating an original and natural feeling. People would feel like seating in the valley accompanied by old caves, creeks and lakes. The slits on the roof were not only helpful to inject natural light, but also working to introduce the wind. The air passed through the narrow slits producing a sound of wind, which emphasized the nature feeling.

From space organization

In Zumthor's book, he introduced an atmosphere creation method named "composure and seduction". Zumthor hoped that the circulation would be guided with the difference of the space feeling rather than clear artificial signs. The induction of space gives people a free and sensitive way to enjoy the architecture space. *"The guide of the circulation is indirect. With the suggestion of the space, people can freely choose their own way to experience the building, which seems to introduce some sedation to the space."* (Zumthor, 2006) This method can make people stop a moment to fully experience the space rather than just passing by the space. These unknown spaces create mystical atmosphere, which interest people with surprise. In Thermal Vals, this induction was realized by different light effects. People walked there to have their own journey of discovery. This project was a good practice of Zumthor's atmosphere theory. He used those methods to create a complex atmosphere of history, nature and mystery. These methods aren't separated. They have promoted each other to interact with people's feeling, realizing a strong emotional transmission through real architecture.



Figure 3.34: Space creation is focus on providing experience and feelings. Thermal Vals, Peter Zumthor
(Source: Zumthor Peter, 2006. *Atmosphere – Architectural environments – Surrounding objects*. Basel-
Boston- Berlin, Birkhauser, 2006. ISBN-10: 3764374950)

Chapter 4

Emotional design in Contemporary Chinese elderly housing refurbishing

1. Presence of living space and its significance for contemporary elderly housing refurbishing

Elderly housing refurbishing is necessary faced to Chinese situations and problems. Elderly housing refurbishing is a process to introduce contemporary significance to original spaces to make it worth and suitable for contemporary life. Presence of things doesn't simply refer to a physical existence, but a social and humanistic worth. In Heidegger's theory of presence, he had introduced a situation of "readiness-to-hand", "*zuhandenheit*" in his German word, to describe a basic interaction between human and things' presence. Things showed their presence and value to human only when they were ready-to-hand through processes of dealings with human.

"The Being of those entities which we encounter as closest to us can be exhibited phenomenologically if we take as our clue our everyday Being- in-the-world, which we also call our 'dealings'". (Martin Heidegger, 1962, p96)⁴⁶. "We shall call those entities which we encounter in concern of 'Zeug'⁴⁷. In our dealings we

⁴⁶ Martin Heidegger, 1962. *Being and Time*. Blackwell Publishers Ltd, translated by John Macquarrie & Edward Robinson.

⁴⁷ 'das zeug'. The word 'Zeug' has no precise English equivalent. While it may mean any implement, instrument, or tool, Heidegger uses it for the most part as a collective noun which is analogous to our relatively specific 'gear' (as in 'gear for fishing') or the more elaborate 'paraphernalia', or the still more general

come across equipment for writing, sewing, working, transportation, measurement. The kind of Being which equipment possesses must be exhibited. The clue for doing this lies in our first defining what makes an item of equipment-namely, its equipmentality." (Martin Heidegger, 1962, p97).

"Equipment can genuinely show itself only in dealings cut to its own measure (hammering with a hammer, for example); but in such dealings an entity of this kind is not grasped thematically as an occurring Thing, nor is the equipment-structure known as such even in the using. The hammering does not simply have knowledge about the hammer's character as equipment, but it has appropriated this equipment in a way which could not possibly be more suitable. In dealings such as this, where something is put to use, our concern subordinates itself to the "in-order- to" which is constitutive for the equipment we are employing at the time ; the less we just stare at the hammer-Thing, and the more we seize hold of it and use it, the more primordial does our relationship to it become, and the more unveiledly is it encountered as that which it is as equipment. The hammering itself uncovers the specific 'manipulability' ["Handlichkeit"] of the hammer. The kind of Being which equipment possesses-in which it manifests itself in its own right-we call "readiness-to-hand" [Zuhandenheit]." (Heidegger, 1962, p99).

Human always valued things with this mood of "in-order-to". Human can encounter presence and value of things only when they need to use it as equipment. Without this "in-order-to" and process of practice, human never find if a thing is valuable for them. When things present more satisfactions to the mood of "in-order-to", their presence and value are more obvious. Processes of satisfactions to series of "in-order-to" promote the development of things and our world.

Space, to human, is also valuable as equipment. *"What we encounter as closest to us is the room; and we encounter it not as something 'between four walls' in a*

'equipment', which we shall employ throughout this translation. In this collective sense 'Zeug' can sometimes be used in a way which is comparable to the use of 'stuff' in such sentences as 'there is plenty of stuff lying around'. (See H. 74.) In general, however, this pejorative connotation is lacking. For the most part Heidegger uses the term as a collective noun, so that he can say that there is no such thing as 'an equipment'; but he still uses it occasionally with an indefinite article to refer to some specific tool or instrument-some item or bit of equipment. (Martin Heidegger, 1962, p97)

geometrical spatial sense, but as equipment for residing.” (Heidegger, 1962, p98). Living space shows its presence because that human in order to dwell. The process of satisfying this dwelling desire makes living space to be presented with significance.

Living space creation is just a process to satisfy human’s dwelling desire. So, when we want to talk about living space creations, we should firstly come back to see the nature of dwelling desire. Heidegger has talked in his book *Building Dwelling Thinking*⁴⁸:

“When we speak of dwelling we usually think of an activity that man performs alongside many other activities. We work here and dwell there. We do not merely dwell-that would be virtual inactivity-we practice a profession, we do business, we travel and lodge on the way, now here, now there. Bauen originally means to dwell. Where the word bauen still speaks in its original sense it also says how far the nature of dwelling reaches. That is, bauen, buan, bhu, beo are our word bin in the version: ich bin, I am, du bist, you are, the imperative form bis, be. What then does ich bin mean? The old word bauen, to which the bin belongs, answer: ich bin, du bist mean: I dwell, you dwell. The way in which you are and I am, the manner in which we humans are on the earth, is Buan, dwelling.” (Heidegger, 1951, p2)

Dwelling is the most basic and original desire of human. Living space was just born under this desire that human need a protected and pleasant space to satisfy their requirements of dwelling activities. This desire gave living space its original form. However, the presented shapes of living space are always affected and decided by different human’s identities, as said Heidegger that dwelling is the way we are. Dwelling activities are reflections of human’s identities, showing what they are in every part including thoughts, cognitions, cultural background, favorites, experience.... Just due to this, dwelling activities have presented difference depend on human’s identities, which are finally reflected on their living space shapes. This is why we can always see differences of living space model among different countries. Living space is a presentation of human’s own

⁴⁸ Martin Heidegger, 1951. *Building Dwelling Thinking*. Harper Colophon Books, New York, translated by Albert Hofstadter, 1971.

characteristics, in both physical scales as ages, abilities, acknowledges, technologies and mental scales as favorites, aesthetics, cultures, and perceptions.

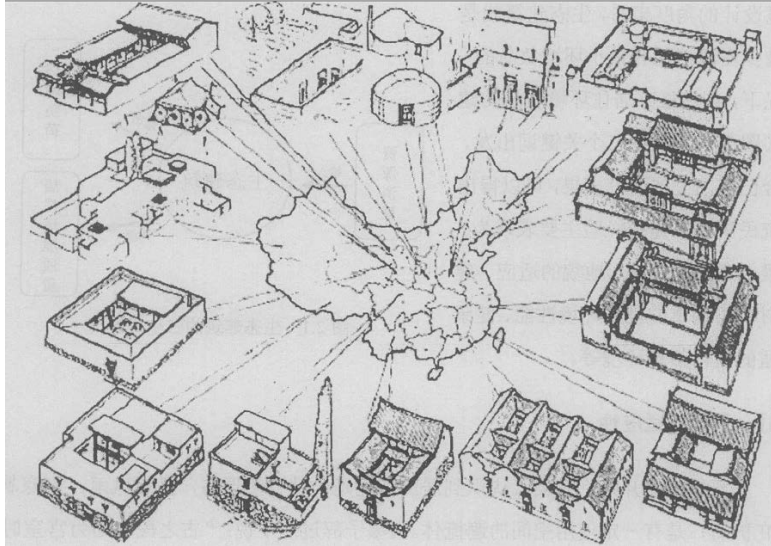


Figure 4.1: Traditional living space shapes varied with areas in China.(Source: Fuxi Shen, 2001. *History of Chinese ancient architecture and culture*. Shanghai Ancient Books Publishing.)

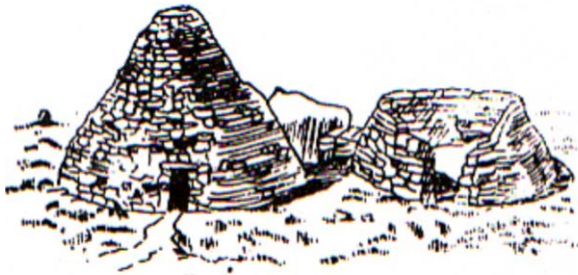


Figure 4.2: Ancient stone house of England. (Source: Xiaowei Luo & Yingwan Jiang, 2005. *Foreign architectural history map*. Shanghai Tongji University Publisher.)



Figure 4.3: Ancient housing model of North Europe. (Source: Bill Riseboro, 1979. *The Story of Western Architecture*. Published by Charles Scribner's Sons, New York (1979))



Figure 4.4: Ancient housing model of Assyria. (Source: Xiaowei Luo & Yingwan Jiang, 2005. *Foreign architectural history map*. Shanghai Tongji University Publisher.)



Figure 4.5: Housing model of ancient Roma. (Source: Bill Riseboro, 1979. *The Story of Western Architecture*. Published by Charles Scribner's Sons, New York (1979))

Different places have their special traditional housing models with particular materials, architectural forms, distributions and decorations based on their social identities. Shapes of living space are reflections of and affected by humanistic identities, including culture, habits, thoughts, cognitions, art...etc.

Although living space models are presented in different shapes, we can try to find some common characteristics. When we came back to Heidegger's words about the nature of dwelling, we can find that human's dwelling activities always have their fundamental desires and characteristics of being protected and free. *"To dwell, to be set at peace, means to remain at peace within the free sphere that safeguards each thing in its nature. The fundamental character of dwelling is this sparing and preserving."* (Heidegger, 1951, p3)

This sparing and preserving are basic and common requirements for living space, rooting in the most original desires of human beings for their dwelling activities. Living space, regardless of proprietors, should firstly meet to the fundamental requirements of dwelling. Living space, basically, should provide an environment where human could feel being protected, and could stay freely.

If we used Louis Kahn's words to conclude the presence of living space, we could say that human's dwelling desire of sparing and preserving have given living space its original form with basic characteristics of protection, nature and freedom. While different human identities have led to obvious differences in re-expressing shapes. Presence of living space and the shapes are showed and developed through the interactions with human being, always adapting and satisfying to human's desire and requirements of dwelling activities.

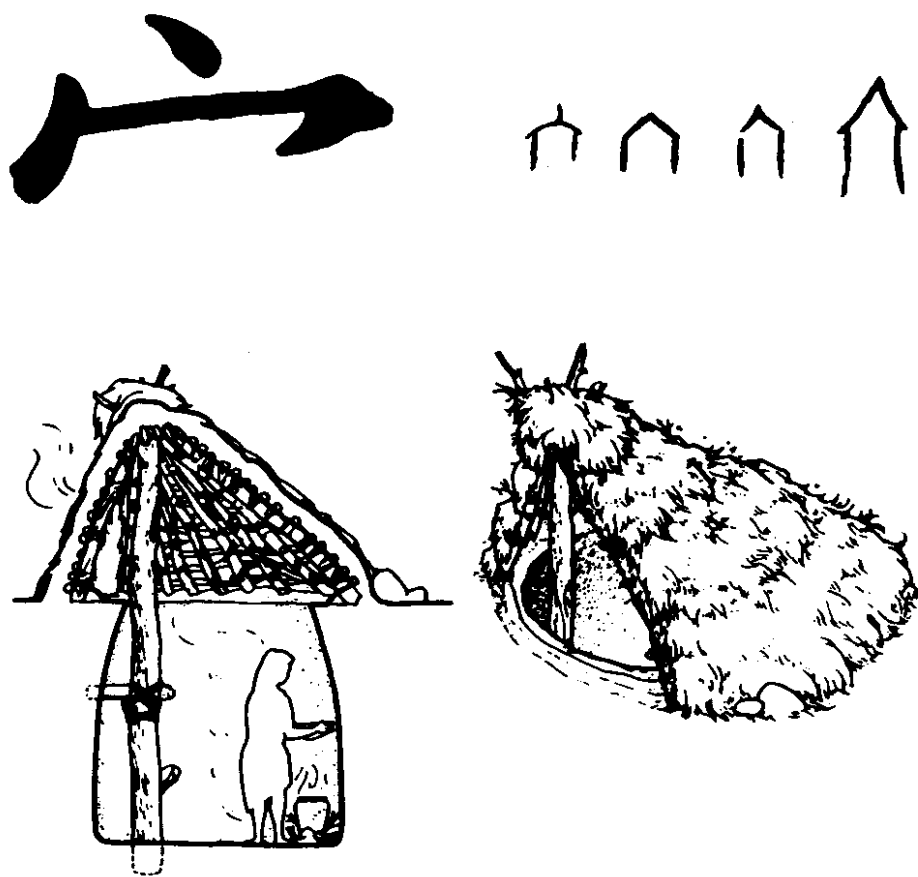


Figure 4.6: Original concept of living space: a place with protections by roof and walls. Home in Chinese is written as “家”. The part above is “宀”, which came from the original house concept of protection. Living space can have different presented shapes depend on different humanistic proprieties, but the original desire of preseving and sparing contained in living space always remains same. (Source: Ancient human housing models and cultures, 2014,03.)

Living space refurbishing could never lose the nature and presence. The more satisfaction to human's dwelling desires and requirements, the presence and significance of living space would be more experienced. As said before, dwelling is a way to tell what they are, which is based on a common desire of being protected and sparing. Living space with presence could be treated as a totality of ready to hand equipment to serve for human's "in-order-to" of dwelling. Essentially, creation of presence of contemporary living space is a process that architects look for and organize elements based on identities of space user to make space ready-to-hand and work positively and effectively to meet human's contemporary dwelling desires and requirements.

For Chinese elderly, living space is a place that contacts most directly and frequently. Facing to Chinese problems, contemporary elderly housing refurbishing is to re-express space with new presence adapted to contemporary requirements and conditions. It is a process to combine Chinese elderly's special identities with contemporary characteristics, presenting who they are in contemporary life. At the same time, it is also a process to provide better protection, free and other positive atmosphere to improve their life qualities adapting to the whole development of contemporary society.

In this process, emotion has played an important role. Human perceived the presence of world through the generations of series emotions.

"The fact that this sort of thing can "matter" to it is grounded in one's state-of-mind; and as a state-of-mind it has already disclosed the world-as something by which it can be threatened, for instance. Only something which is in the state-of-mind of fearing (or fearlessness) can discover that what is environmentally ready-to-hand is threatening. Dasein's openness to the world is constituted existentially by the attunement of a state-of-mind. (...) Existentially, a state-of-mind implies a disclosive submission to the world, out of which we can encounter something that matters to us." (Heidegger, 1962, p177). In case of living space creation, satisfaction of dwelling desire is mainly showed by generating corresponding emotions. Readiness-to-hand of elements is also experienced and judged by emotions.

2. Main emotional requirements of living space refurbishing for Chinese elderly

Based on the former theories, emotional design is a great part in contemporary elderly housing refurbishing. Coming back to the nature of dwelling desire and requirement, emotional touches should always serve to desires of being protected and free, as well as a hope of expression their own identities.

2.1. Sense of safety

Being protected and free, above a physical statue, more refer to a state of mind, a sense of safety, which is a principal requirement human's dwelling activity. When we talk about the term "safe space" in mind, most people would think of their home where dialogues are open and free of judgment

and people can stay without any sort of threat, stresses or anxieties.⁴⁹ *"Dasein's basic state and in our clarification of the existential meaning of 'Being-in' as distinguished from the categorial signification of 'insideness', Being-in was defined as 'residing alongside.', 'Being-familiar with'. This character of Being-in was then brought to view more concretely through the everyday publicness of the 'they', which brings tranquillized self-assurance – 'Being-at-home', with all its obviousness-into the average everydayness of Dasein."* (Heidegger, 1962, p177). Creations of sense of safety in living space design is to make a place as where we feel at home in state of mind. It is a place which we feel familiar to and safe, a place where we could stay relax without any loneliness and anxieties. In

⁴⁹ Alex Haslam, 2018. "How to Create Your Own Safe Space at Home: Adjusting your environment can help increase your feelings of physical and emotional safety." *COMMUNITY*, August 14, 2018. <https://thriveglobal.com/stories/how-to-create-your-own-safe-space-at-home/>

contemporary elderly housing refurbishing, creation of sense of safety should be realized by construction of safe physical environment as well as creation of healthy mental environment to eliminate negative feelings like loneliness, helplessness and strangeness.

Physical safety

In safety sense creation process for elderly housing, physical safety construction works as a base. Physical safety, which provides a guarantee for healthy and pleasure life, is a necessary way to simulate human's state of mind to make them feel they are living with protections. Architectural measures could use to control space safety from all the parts as material, distribution, and facilities. For the elderly, installations of enough accessible facilities could ensure their basic requirement for safe and convenient life, especially for those who live alone. Introductions of high tech to adjust temperature, light, ventilation and humidity in contemporary housing are very helpful to create a healthier and more comfortable living environment. Soft materials can avoid physical hurt and create a warming atmosphere. Rational planification of community medical assistance or nursing care services can provide further protections for the elderly, especially in emergency cases.

Sense of safety in mind

Above safety in physical level, sense of safety is consisted of more complex emotions. From Heidegger's theory, sense of safety, which roots in human's original desire and nature of dwelling in the world, could explained as "*residing alongside*" and "*Being-familiar with*" (Heidegger, 1962, p177). In this sense, familiarity and being accompanied are two core emotional elements for safety in state of mind.

In these two factors, familiarity means something we know well and are not anxiety to. Familiarity of space means that spatial elements are something that already exists in or is related to memories or knowledges, something belongs to people's perceptions, understandings, habitats, culture and aesthetics. People could easily accept the space and live in with tranquility and confidence. Familiarity is an essential reason to explain the Chinese situation why more

elderly people prefer aging in place even if their original homes are not in good conditions. It is a strong characteristic of “home” in mental state, helping to create strong sense of safety.

Familiarity of architectural space is interacted with memories, local culture, tradition, habitats and experience, generating positive emotional resonances. Introduction of familiarity in elderly housing can be divided into two parts: social familiarity and personal familiarity. Social familiarity is related to common identities in scale of culture, tradition and habitats, which varies from different communities. On the other part, personal familiarity especially focuses on space user interacted with their own experience and memories. Creation of familiarity in elderly housing should be adapted to common identities with injection of cultural and local elements as well as respecting to personal memories and experience.



Figure 4.7: Memory scene of Beijing. (Source:<https://kuaibao.qq.com/s/20180708A0H51Q00?refer=spider>)



Figure 4.8: Memory scene for local elderly of Beijing. (Source: <http://cat3dog4.com/news/news-21603.html>)

2.2. Stay freely

Home is a place where people can stay in their natural state with freedom. Elderly housing can develop from both interior and outdoor space to provide free and natural atmospheres.

In this sense, interior atmosphere can be controlled from visual elements as well as tactile experience by using suitable color, forms, materials and textures, to create free, natural and relaxed environment. On the other hand, outdoor environment creation could particularly attractive for elderly people and stimulate to generate positive feelings of freedom, pleasure and relax. 'Kengo Kuma has said: *"Everyone has a to go back to the field and nature, seeking return in the heart. Sometimes architecture can make this dream come true."* "According to

the Attention Restoration Theory (ART) developed by Kaplan and Kaplan⁵⁰, exposure to and experience with nature can also help to restore attentional functions and reduce mental tiredness.”⁵¹ Influences of nature on the elderly’s mind could be proved by the survey of Håkon Johansen and Marianne Thorsen Gonzalez. They had interviewed elderly residents in nursing house between the ages of 62 and 90 agreed about their experience. The residents said,

“I feel more alive in springtime”, and that being able to go outside gave a feeling of freedom: “It represents freedom, I think it’s wonderful to be outdoors as much as possible.” (Håkon Johansen& Marianne Thorsen Gonzalez, 2018)

Views from indoors onto outdoors serve as enticements, tempting one to go outside and enjoy the garden. Seating or moving in the outdoor space with water or colorful decorative plants promotes a sense of well-being. Furthermore, nature spaces are especially well loved when they are always there, changing with the seasons and time of day. The interaction between nature and time makes people feel the life and presence of space. The organic space decorated with natural elements or related with nature seems to have its vibration, which could be an excitation to the old people’s mind.

In Chinese philosophy, they advocated the realm of harmony between human and nature. Nature and human are a whole. Every truth comes from nature. Chinese people seek natural statues in their living space. It can be seen from those traditional houses of China. No matter the Siheyuan in Beijing or the Chinese traditional garden, nature environment always plays an important role in the whole design, which is one of the most important thoughts in Chinese culture. For Chinese people, the beautiful nature environment is not so easy as just putting some green plants around. Moreover, it needs to combine with art and philosophy to create a meaningful artistic and harmonious atmosphere with rich emotional experience. From the survey of Yanmin Zhou, old people, being its longest users, the natural environment should adapt the most to their emotional needs. Chinese

⁵⁰ Kaplan R, Kaplan S, 1989. *The experience of nature: a psychological perspective*. Cambridge: Cambridge University Press; 1989.

⁵¹ Håkon Johansen& Marianne Thorsen Gonzalez, 2018. “Being in contact with nature activates memories and offers elderly people in nursing homes beneficial experiences”. *Sykepleienf*, 2018.69738.

old people, influenced by the traditional cultural thoughts, need a carefully designed, friendly and artistic natural environment like the Chinese traditional garden.

2.3. Personal identities

Dwelling is an activity telling what we are. Living space is presenting personal identities. Contemporary living space couldn't lose its identity. This identity refers to both social characteristics, like culture and art, and personal ones, like experience and value. Living space with identity could provide sense of belongings which implies a positive acceptance by the group of users or the single user. Introduction of cultural and esthetic elements are necessary to simulate emotional reflections of identities.

Personal value is another essential factor which could be thought and reflected in living space for the elderly. Dwelling activities are reflections of personal value that human participate in the world and create values to society in their ways. Dwelling is worth to show personal presence and significance. For the elderly, especially those who have retired from their work, living space should provide possibilities to make the elderly participate in the world and lived with value in their own ways. It could be realized with introductions of public space adapted to user's identities and experience.

“Living space has a special emotion. Like music, although every kind of emotion can be described by an existed music, there are still many love songs being created every day. From this we can see that the meaning of music is to fully express the human's emotion rather than the new context. The living space is the love song in architecture. We use the living space to express the emotion about the individual's experience, memory and wishes of the future. Just this true emotion rather than the uniqueness forms the essence of living space. This true emotion is the home sense of a living space.” ---- Kazuo Shinohara

3. Emotional design methods study in refurbishing of Contemporary elderly housing based on Norman's three design levels

Architecture elements always work together to make stimulations on elderly people's mind to generate emotional resonances. In Chinese contemporary elderly housing refurbishing process, expressions of corresponding emotional points need to be generated by a synergy of different architectural elements. According to Norman's methodology, design can involve with human's emotion from three levels: Visceral, Behavioral and Reflective. In architectural field, architectural elements cooperate with each other to generate stimulations in these three different levels and work together to complete the emotional creation process. Corresponding to these three levels, architecture design methods of emotional expression in contemporary elderly housing refurbishing process can be studied from three aspects: architecture appearance, space function and utility, and emotional reflection.

3.1. Architecture appearance

Architecture appearance is corresponded to visceral level, that is to involve human's emotion from first impressions. When people see a building and enter it, they immediately have their first impressions which are mainly associated to visual, tactile, and hearing experience. First impressions create first emotional touches for people telling them whether they are attracted by the space or not. Positive impressions can make people be interested in space and promote them to explore the space in depth. In elderly housing design, creations of positive

impressions need to be developed by effectively attraction from different senses of visual, tactile and hearing. While the attraction is only effective when it is associated to the main emotional requirements of living space. In details, on this level, attraction of architectural appearance is firstly linked to esthetic identities, providing some kind of beauty. Beautiful appearance is always the most basic and effective attraction to space user. Secondly, as living space, architectural appearance needs to attract people by providing some kind of safety sense, making people feel it is a safe place to live as home. Thirdly, natural and free sense are other necessary attraction to generate positive impressions as living space. Architectural appearance elements, mainly referring to visual, tactile and hearing elements, should be always designed to contribute the emotional attraction to involve visceral emotional resonances in contemporary elderly housing refurbishing process.

3.1.1. Visual attraction

Visual attraction creates the most usual and direct impressions on people's mind. When people see a building or a space, they will be affected by architectural visual elements as shapes, colors, materials and illuminations. These visual elements work together to generate the first feeling for people, telling them whether they like or not directly. Positive impressions could make people interested to experience more of the space. In elderly housing, visual attraction of architectural appearance is mainly related to two aspects: intimacy and aesthetics.

Intimacy of architecture appearance

Architectural appearance should be thought to provide attraction always associated with sense of safety, nature and aesthetics. According to the former studies, sense of safety refers to space that we feel safe and familiar, space we don't feel strange and being frightened. When we compare current Chinese elderly residence areas with European works, we could find that current Chinese elderly residence areas are always presented in huge scales while European works tend towards more friendly shapes adapted to human scales. People are easier to be attracted by European works and generate positive impressions suitable to their emotional perceptions of home than seeing the huge residence buildings. This

difference in scale has influenced on architectural intimacy which evokes with sense of safety for the elderly. Current design of elderly housing in China, like those in America, which has marked in shapes of large-scale mega-complexes with intention to house the maximum amount of people with the minimum amount of effort, always lacks the sense of intimacy. It makes people feel under pressure and nervous without any home sense. Intimacy of architectural shapes contributes to create attraction associated to sense of safety.

In the Ulrika Eleonora Senior Home in Loviisa Finland, which is designed by the L&M Sievänen Architects, the building forms a "village" of small-scale housing units. The village has "terraced" and "semi-detached" houses. Another aim was to continue the small-scale dimensions and intimacy of the streetscape. Using fan-shaped articulation and terracing of the site, the fairly large building complex was fitted into the terrain. It is situated in a gorgeous setting with fantastic views; the design seems deliberate and thought-out by good architects. This project aims to offer respect and appreciation to those individuals who paved the way before them.



Figure 4.9: small scale house units of Ulrika Eleonora Senior Home in Loviisa Finland (Source: archidaily)

In cases of large architectural volumes, design methods could be used to reduce shape scales in visual effects. In the BaptCare Brookview elderly residence in Westmeadows of Australia, different parts of slip roofs have reduced the long volume in visual impressions. And the combination of colored bricks in a geometric pattern further breaks down the scale of the building. Although the architecture has a long volume, it creates impressions of intimacy by reducing the scales in visual effects.



Figure 4.10: BaptCare Brookview elderly residence in Westmeadows of Australia. Big volume was reduced by slipped roofs and brick patterns.(Source: Photo by Rhiannon Slatter, *Archidaily*)



Figure 4.11: BaptCare Brookview elderly residence in Westmeadows of Australia. Big volume was reduced by slipped roofs and brick patterns.(Source: Photo by Rhiannon Slatter, *Archidaily*.)

Apart from the influence of scale of architecture shapes, intimacy of architectural appearance could be also realized by applications of familiar symbols. For the elderly, architecture appearance with familiar elements would attract them and make them feel close. This familiarity could generate positive impressions on the visceral level, leading the elderly interested and want to get closely. These positive impressions of intimacy on visceral level finally could also involve with memories in the reflective level to create a deep emotional touch of home sense on elderly people's mind. The series of stimuli from visceral to reflective level complete the whole emotional creation process.

As doing architects Hawkin and Brown in their project of community center in Enfield, familiar elements from urban textures have been taken to present the regeneration process of the city, creating a series of intimacy on their architectural appearance as well as the inner space.

*"The scheme includes 118 new residential units of which 22 are houses. A health centre and a new community facility, designed by Hawkins and Brown also occupy the site. Located in an area of social and economic deprivation, the site interfaces with both a town centre high street and streets of two storey terrace houses. The scheme seeks to make a positive statement of regeneration through a distinctive architectural form and a responsive urban site planning approach."*⁵²

The whole architecture appearance presented a familiar image by compositions of traditional bricks in different colors. All these colors came from urban texture and integrated into the whole urban composition, showing urban regeneration processes. Architectural image is well adapted to the city identities, creating a special intimacy on the first impression. When people see it, they know it belongs to their familiar city.

⁵² Text description provided by the architects. <https://www.archdaily.com/778208/highmead-hawkins-brown>



Figure 4.12: Architecture appearance create a familiar image by using similar color compositions to the urban identities. Regeneration process of this city is reflected on architectural image, creating a special intimacy to the citizens.(Source: Photo by Tim Crocker, *Archidaily*.)



Figure 4.13: Compositions of material and color are adapted to city images.(Source: Photo by Tim Crocker, Archidaily.)

Visual aesthetics of architectural appearance

Besides intimacy, it is very important to present a kind of aesthetics on architectural appearance of elderly housing. Aesthetics are always the most direct and effective reasons to make people be attracted. Not only for the elderly, it is common that beautiful shapes are more easily to make people interested and pleasure, creating a strong touch on their first impressions. For the elderly, based on their emotional requirement of home, aesthetics of contemporary housing could be created mainly focus on two aspects: aesthetics of nature and of art.

“In the creation of architecture, architects charge their architectural design by adding an artistic touch to it. This can be done by use of stylistic archetypes that project an emotional value that that is discernable for the person who is in the process of appropriating a certain space. The architects have to rely on their artistic and professional skills to make an accurate interpretation of the “sense of place” that belongs to the building site or that will be affirmed or renewed by the architectural design.” (J. E. Andersson, 2011, p.72)⁵³

In Steven Holl’s project of Maggie’s healthcare center, artistic thoughts have been introduced to give a special esthetic touch to the elderly here. This healthcare center is located in the center of London, which is adjacent to the oldest hospital of London.

“Layers of history characterize this unique site, connecting deeply to the Medieval culture of London.”⁵⁴

Steven Holl didn’t follow the historical styles of bricks of this area. Instead, he reorganized city textures with his contemporary artistic architecture system to add new appearance and energy to the old center.

“The building is envisioned as a ‘vessel within a vessel within a vessel.’ The structure is a branching concrete frame, the inner layer is bamboo and the outer

⁵³ Jonas E Andersson, 2011. Architecture and Ageing. Doctoral thesis in Architecture Stockholm. Sweden 2011.

⁵⁴ Text description provided by the architects. <https://www.archdaily.com/885886/maggies-centre-barts-steven-holl-architects#>

layer is matte white glass with colored glass fragments recalling “neume notation” of the Medieval music of the 13th century.”⁵⁵

In his thoughts, architecture can't be separated from other kind of arts. Architecture is another kind of music. The interdisciplinary interpretation has created a unique artistic attraction in this historic area. The colorful fragments from historical music created an active and energetic image to the elderly which easily makes them feel pleasure and interested.



Figure 4.14: Music fragments are applied in architectural appearance creation, generating special visual artistic attraction. (Source: Photo by Iwan Baan. *Archdaily*.)

⁵⁵ Text description provided by the architects. <https://www.archdaily.com/885886/maggies-centre-barts-steven-holl-architects#>

Corresponding to the facade, colorful music notes is always the main theme of the architectural appearance, which could be seen in the interior illuminations.

“The glass facade geometry, like a musical ‘staff’, is in horizontal strips 90cm wide, which follow the geometry of the main stair along the north facade, while lifting up with clear glass facing the main square, marking the main front entrance. There is a second entry on the west opening to the extended garden of the adjacent church. The building tops out in a public roof garden open to a large room for yoga, Tai Chi, meetings etc. The interior character of this building will be shaped by coloured light washing the floors and walls, changing by the time of day and season. Interior lighting will be organized to allow the coloured lenses together with the translucent white glass of the facade to present a new, joyful, glowing presence on this corner of the great square of St. Barts Hospital.”⁵⁶

This colorful appearance helps to inspire the elderly and excite their passion to life.



Figure 4.15: Applications of colourful music notes form the main esthetic concept of architectural appearance both exterior and interior. (Source: <http://architectonicsofmusic.com/maggies-center-barts>)

⁵⁶ Text description provided by the architects. <https://www.archdaily.com/885886/maggies-centre-barts-steven-holl-architects#>

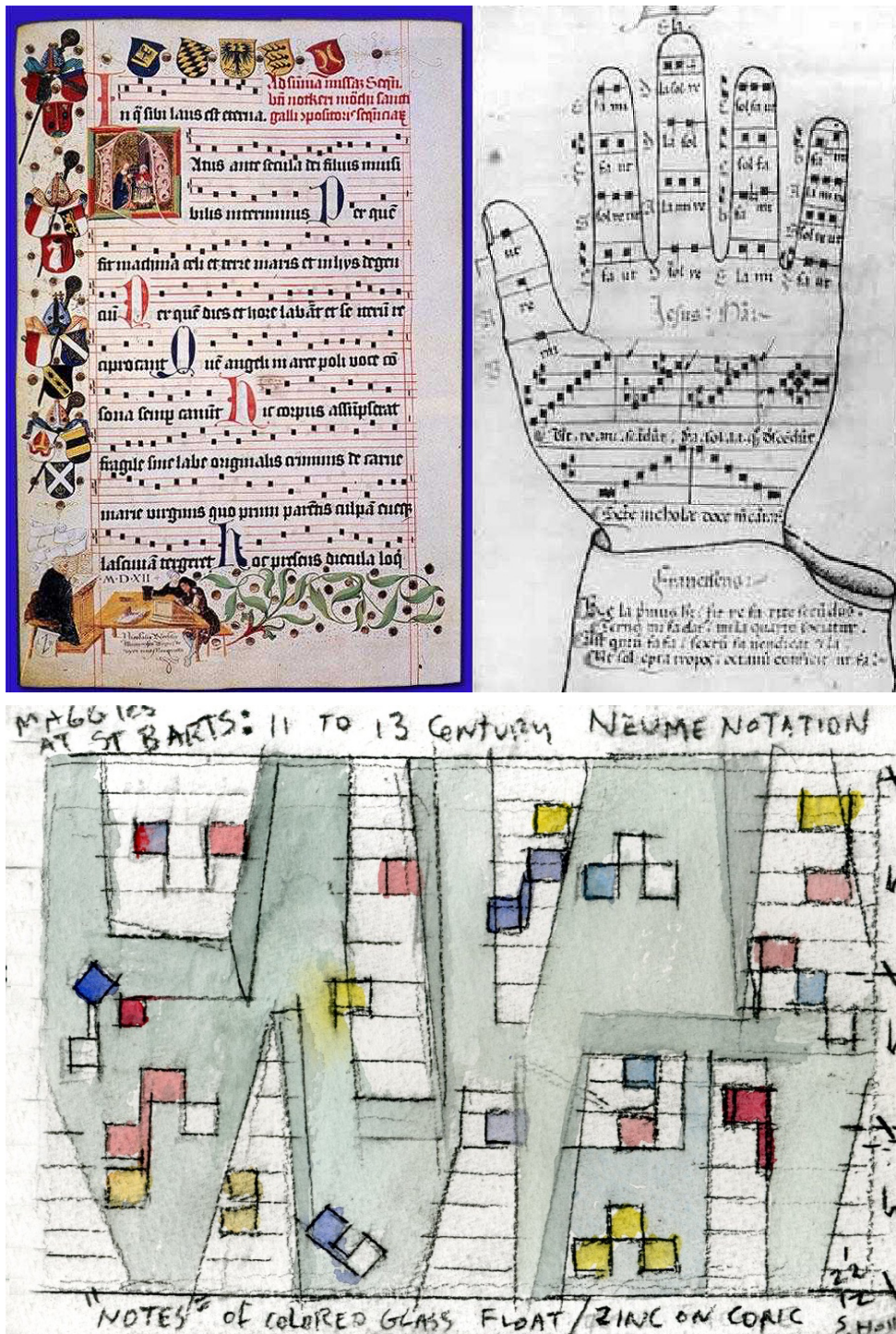


Figure 4.16 & 4.17: Historical music notes were transformed into architectural elements, which created a special artistic aesthetic. (Source 4.16: Architectonics of Music. Source 4.17: Sketch by Steven Holl, Archidaily.)

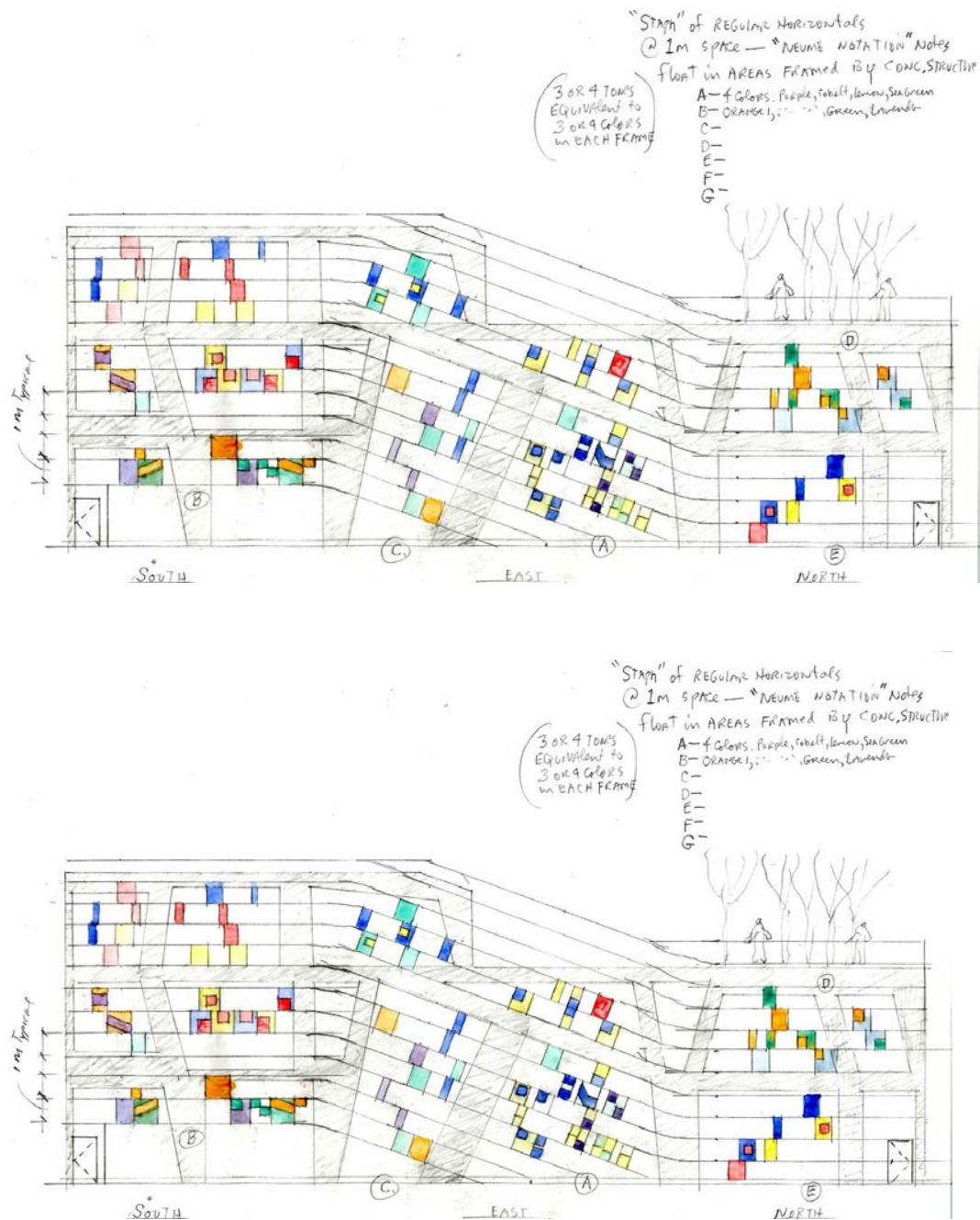


Figure 4.18: Music fragments are always applied in architectural facade concept. (Source: Sketch by Steven Holl, Archidaily.)

Besides artistic aesthetic, natural aesthetic is another factor which could affect the first impression for the elderly. As said before, home for the elderly means a place where they can stay safely, natural and free. Natural sense could make the elderly come down and relax. In Maggie's healthcare center, natural aesthetic is also thought as a main concept combined with artistic methods. In the interior space, bamboo is the main material. When the elderly enter into the space, they could feel the natural and warm atmosphere created by bamboo. Combining with the colorful elements and illuminations, the whole visual effects present a pleasant, relaxed, energetic image. The elderly could be easily attracted by this aesthetics as their perfect living space.



Figure 4.19: Concept natural interior appearance.(Source: Sketch by Steven Holl, *Archidaily*.)

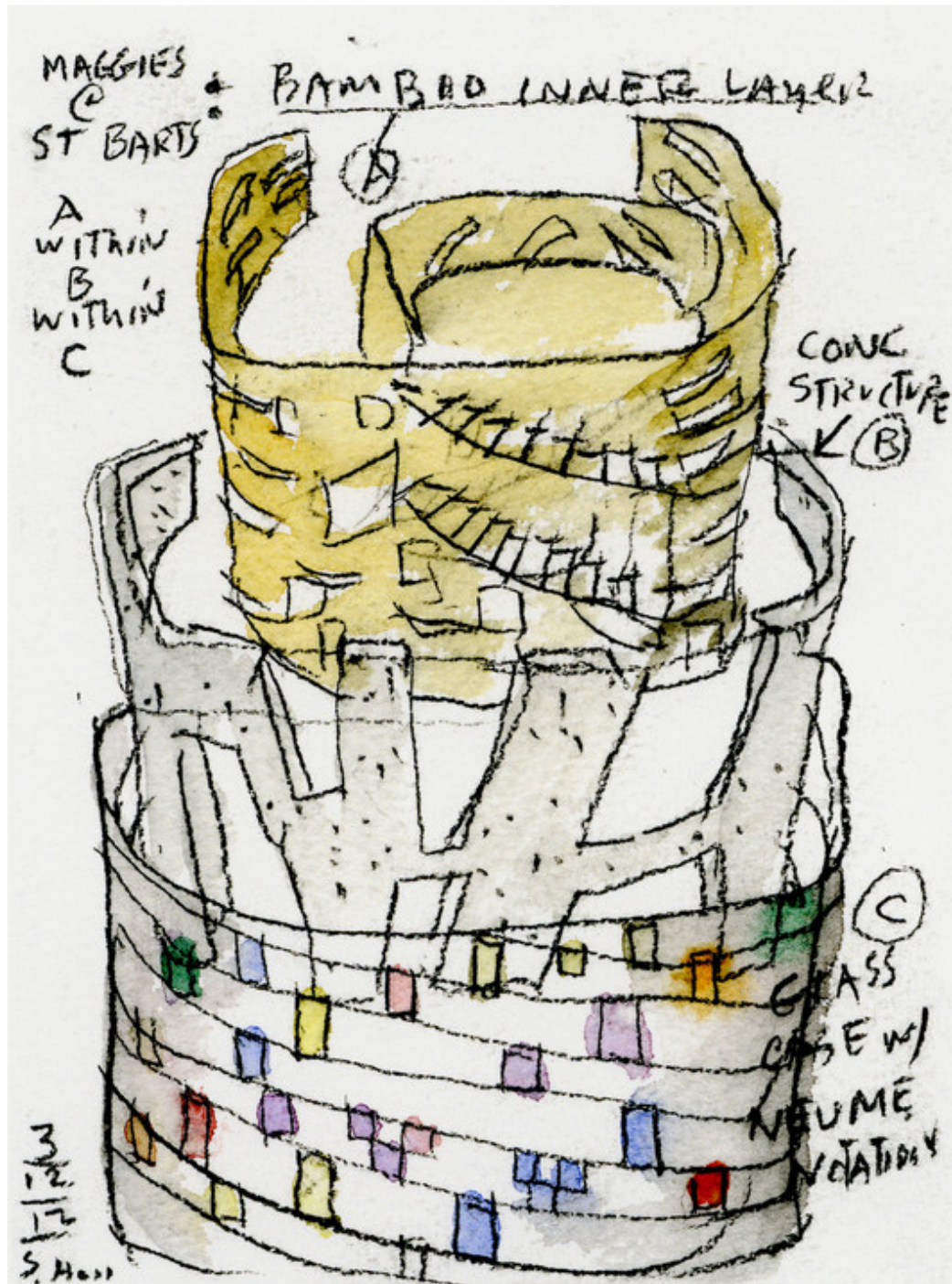


Figure 4.20: Different layers constitute the whole architecture visual appearance. Natural layer of bamboo inside, concrete structure layer in the middle and matte glass facade with colourful music fragments to the outside. (Source: Sketch by Steven Holl, *Archidaily*.)

Contemporary architects pay much attention to natural aesthetics of elderly housing to provide a pleasant, vibrant and relaxed image to the elderly. Especially for developed city center, which lacks of natural park, natural image of architectural appearance could provide strong and effective attraction on elderly people's mind. SK Yee Healthy Life Centre, located in Hongkong center, has created a pure natural image for citizens. Apart from natural space creations, this project has reflected the strong concept of nature by its appearance. *"Its 'lean and green' design allows the SK Yee Healthy Life Centre to provide more than just a healing environment – it also acts as a home, a garden and a playground for patients. Its quiet rooftop location offers an ambience of calmness and serenity throughout, immersing patients in nature and daylight and offering them a stress-free healing experience. It demonstrates an exceptional example of the integration of sustainable design into healthcare architecture."*⁵⁷



Figure 4.21: The whole architecture is covered by green plants, presenting a pure natural image. (Source: Ronald Lu & Partners, 2014. "SK Yee Healthy Life Centre / Ronald Lu & Partners", *Archidaily*.)

⁵⁷ Text description provided by the architects. <https://www.archdaily.com/590542/sk-yee-healthy-life-centre-ronald-lu-and-partners>



Figure 4.22& 4.23: Architectural appearance shows a pure contrast between natural elements and white wall, emphasizing its natural sense. (Source: Ronald Lu & Partners, 2014. “SK Yee Healthy Life Centre / Ronald Lu & Partners”, *Archidaily*.)

Considering all the natural elements, natural light is a necessary factor to create special esthetic impressions for architectural appearance. Natural light gives architecture its life and presence. Not only for elderly housing, in all architecture design field, architectural appearances elements, as material, colour, shapes, could be seen and felt through lights. Lights create vital image for architectural appearances, generating an emotional touch integrated nature, space and life. Those masters of architecture always emphasized the meaning of light to architecture.

“The history of architecture is the history of the struggle for light.”⁵⁸ --- Le Corbusier

“We are born of light. The seasons are felt through light. We only know the world as it is evoked by light.” “I sense Light as the giver of all presences, and material as spent Light. What is made by Light casts a shadow, and the shadow belongs to Light.”⁵⁹--- Louis Kahn

“Light is of decisive importance in experiencing architecture. The same room can be made to give very different special impressions by the simple expedient of changing the size and location of its openings.”⁶⁰ --- Steen Eiler Rasmussen

*“More and more, so it seems to me, light is the beautifier of the building.”
--- Frank Lloyd Wright*

In elderly housing, natural light is an essential factor to affect visual appearance on its attraction. When the elderly enter a space, they see and feel the elements of architectural appearance by the rendering of light. Interactions between light and architectural elements, as materials, textures, colors and space shapes, create poetic effects of light and shadow which could change by time, presenting unique esthetic impressions of nature. According to the emotional requirement of living space for the elderly, they need a place where they can stay naturally and freely

⁵⁸ Le Corbusier Quotes On Light, Materials, Architecture Style And Form

⁵⁹ Louis Kahn quotes at AZquotes.com

⁶⁰ Steen Eiler Rasmussen, 1959. *Experiencing Architecture*. The M.I.T Press, Massachusetts Institute of Technology, Cambridge.

with safety, a place which represents their own life identities. Natural light is just creating a kind of aesthetics associated with these requirements: natural light provides a way to connect interior space to the exterior environment, making the space open, hopeful and energetic. Space presence could be perceived. The elderly could be easily attracted by the poetic aesthetics to think and to feel the nature of space and life.

*“Natural light is one of the key ingredients to make a community feel like a home for seniors. It’s so important and favorable that a feeling of brightness from large windows can even overcome other design elements that are not well liked. By comparison, spaces with an overly dark appearance or window treatments that blocked light gave participants in the study a negative impression.”*⁶¹ (Amy Baxter, 2015)

⁶¹ Amy Baxter, 2015. “Top 5 Design Elements to Make Senior Living Homelike”. *Senior Housing News*, December 13, 2015. <https://seniorhousingnews.com/2015/12/13/top-5-design-elements-to-make-senior-living-homelike/>



Figure 4.24: A place is created within the interior architectural space by means of the interaction between the penetrating daylight, the furniture arrangement and the colour of the individual artefacts. (J. E. Andersson, 2005b). Daylight illuminates and gives the presence of architecture appearance. (Source: Aquarelle by J.E. Andersson.)

Almost all contemporary elderly housings have attached special importance to natural light and its esthetic effects. Big windows and glass curtains always could be seen in European contemporary elderly housing, which provide a bright living environment with natural light.



Figure 4.25: Big windows bring natural light into the room, brightening the space. Residential Care Home Andritz by Dietger Wissounig Architekten (Source: Dietger Wissounig Architekten, 2015. “Residential Care Home Andritz”, *Archidaily*.)

In refurbishing of Santa Teresa retirement house in Lleida, big windows were designed with a protective outer solar system of vertical aluminum louver which shape the interior light and with the continuous neutral floors, creating poetic interactions between natural light and shadow.



Figure 4.26: Vertical aluminum louver shape the interior light and with the continuous neutral floors, creating poetic impressions of natural light and shadow. Santa Teresa retirement house, Lleida, Spain. (Source: BmesR29 Arquitectes, 2009. "Santa Teresa Retirement Home", *Archidaily*. Photo by Amaneceres Fotográficos / Joseph Ardiaca Rodríguez)

3.1.2. Tactile attraction

Visual attraction creates the most usual and direct impressions on people's mind while tactile attraction could help strengthen the impressions. Tactile impressions are mainly related to the texture of material. It could help to improve their feeling of materials, strengthening their impressions of the whole space appearance. As losing their capacities, the elderly always need to touch architectural facilities or elements to help them in their daily life. Due to this, touch is an important part for the elderly to experience the space. Through touching, the elderly have their feelings of texture whether it is rough or smooth, how is the temperature of the material, which all directly affect their first impressions and judgments of the space. In space with natural materials, tactile feelings could emphasize their feeling of safety, nature and warm, further completing the attraction of architectural appearance on the basis of visual impressions. On this point, contemporary elderly housing design should pay attention to tactile feelings of textures apart from visual effects.



Figure 4.27: Bricks in Louis Kahn's architecture. Material has their own characteristics of texture. More than visual images, different textures of material create impressions by tactile. Tactile impressions strengthen the temperature of the materials, feeling its presence and life. (Source: John Lobell, 1979. *Between Silence and Light: Spirit in the Architecture of Louis I. Kahn*. Shambhala Publications, Inc, 2008. ISBN:9781590306048)

Contemporary architects also make attempts on special textures to create artistic tactile attraction for the elderly. Epilepsy Residential Care Home in France, which was designed by Atelier Martel, is a special project for patient of epilepsy. Tactile feelings are fully considered to create a special attraction and pleasure for its user. Concrete parallelepiped with walls softened by the work of an artist, the Epilepsy residential care home of Dommartin-lès-Toul (Meurthe-et-Moselle) is an innovative program dedicated to the treatment and support of people suffering from epilepsy. The whole architecture was made by thick walls, which underlined by ribbed concrete walls cast on site and cut-out window frames, suggesting a heightened and reassuring feeling of protection. Considerable attention has been given to details by using high-quality simple and raw materials: windows and shades are made of wood and the floors are covered with soft materials to reduce injuries in case of falls.⁶²

Special artistic works of texture were introduced in this project, specially focusing on the tactile feelings. With the participation of American artist Mayanna von Ledebur, the facade of the project was formed by a special kind of concrete. Instead of rough texture, the special concrete has provided a new sensorial experience, hence becoming sensual, tactile, round and soft. Its smooth “skin”, almost snowy, underlines the presence of the building in its environment both trough visual and tactile.

⁶² Text description provided by the architects. <https://www.archdaily.com/780347/epilepsy-residential-care-home-atelier-martel/5697230ee58ecf75500004a-epilepsy-residential-care-home-atelier-martel-photo>



Figure 4.28: Special concrete was used to create tactile attraction (Source: Atelier Martel, 2015. “Epilepsy Residential Care Home”, *Archidaily*.)



Figure 4.29: Smooth and soft concrete skin combined with natural wood, together creating a tactile impression with temperature and humanistic care. (Source: Atelier Martel, 2015. “Epilepsy Residential Care Home”, *Archidaily*.)



Figure 4.30: Smooth and soft concrete skin combined with natural wood, together creating a tactile impression with temperature and humanistic care. (Source: Atelier Martel, 2015. "Epilepsy Residential Care Home", *Archidaily*.)



Figure 4.31: Its smooth “skin”, almost snowy, underlines the presence of the building in its environment both through visual and tactile. Artistic work by Mayanna von Ledebur and architecture by Atelier Martel. (Source: Atelier Martel, 2015. “Epilepsy Residential Care Home”, *Archidaily*.)

3.1.3. Sound attraction

Sound is a factor that always make influences on people's impressions of space while it is also very easy to be ignored. *"Sometimes when people enter a space, they see perfect visual appearances but they still don't would like to live there. They feel something unexpected but they don't know why. Mostly, it is a result of sound. People are always very sensitive with sound."* said Josep Cerdà, professor and director of sound art master of fine art school of University of Barcelona, in his conference of sound art. The influence of sound always happens unconsciously but decisively, affecting people's feeling and judgment of space qualities in all the experiencing process of space. In contemporary elderly housing, sound is a factor that couldn't be ignored to create a positive emotional environment.

Based on Norman's theory, sound is a complex factor that could affect elderly people's mind from all three levels of visceral, behavioral and reflective. We are always hearing and getting emotional information from the sound while we enter in, see, use and think of the space. With experiencing the space, the elderly could be touched by different sound aspects in whole emotional process. First impressions of sound appearance, comfort of acoustic living environment and reflections of sound identities gradually deepen the feelings of the elderly on space, creating a complete emotional experience by sound.

Corresponding to the visceral level, sound, as other elements of architecture, attracts the elderly by creating positive impressions associated with their perceptions of home. Esthetic sound could immediately catch people's attention and creating impressions of pleasure and being relax, strengthening their interests and love of the space on the basis of visual and tactile impressions.

In visceral level, attraction is mainly realized by creation of aesthetics of sound. As visual attraction, architects or artists could use art methods to create special sound environment with aesthetics to give the elderly positive and homelike impressions. Here, sound is treated as an artistic element to create an esthetic and poetic feelings. Based on former studies, aesthetics of sound could be mainly

realized in architectural space by two ways: artistic installations of sound and soundscape design.

Sound artistic installations

At the beginning of 20th century, some avant-garde artists started to use sound instead of other visual materials to make artistic works. Different from musicians, artists tried to experience sound as an experimental material, exploring materials, shapes and spaces for their sound. They focused on the nature, texture, morphology of sound and made artistic installations to express possibilities of sound aesthetics. For these artists, not musicians, sound became an experimental form, an exploration of new possibilities and expressive territories. They combined their artistic works of sound with space to create a fresh and attractive experience.

The first experimenters with sounds were the sculptors, who worked with sound as materials freely, without prejudices, finding a new expressive dimension. The Futurist artist, Luigi Russolo (1885-1947), between 1910 and 1930, built 27 sonorous sculptures named intonarumori. They were wooden acoustic boxes that produced noise amplified by speakers. The sound was modulated by means of levers that produced glissando. The noises, for the futurist artists, were the maximum manifestation of human progress and reflection of our society. With the intonated ones, these sculptures pretended to harmonize them to create music and were the ancestors of synthesizers and noise music. These sonorous sculptures, halfway between the sculpture and the musical instruments, had names that referred to the sound produced: exploiter, crepitador, buzzer, rubbish, whistler, ululator, squeezer, bursting, gurgling ... all a poetic compendium of sounds. In 1916, Marcel Duchamp created the ready-made "A bruit secret", a sound sculpture that produces an interior sound that nobody knows (nor Duchamp himself) which is the object that produces it.

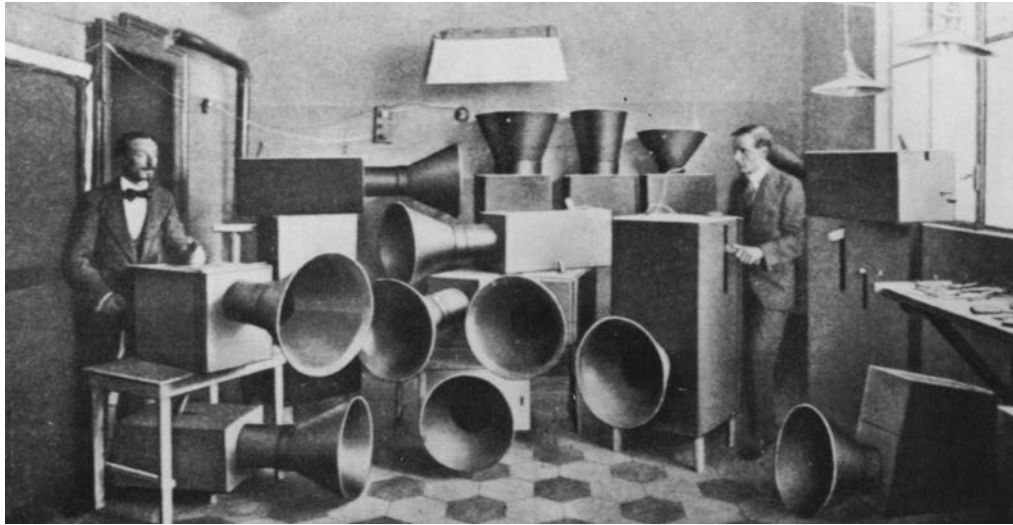


Figure 4.32: First sound sculpture of Luigi Russolo. 1914 (Source: Dr. Josep Cerda's master class of sound art)

From 50s of the 20th century, sculptures of sound art started to have their authentic appearance. Jean Tinguely (1925-1991) begins to create sound sculptures activated by machines; Harri Bertoia (1915-1978) experimented with the sound of the metals; Takis (1925) experimented with electromagnetic sounds. The Baschet brothers, which were considered as the precursors of sound sculpture, François (1920-2014) and Bernard Baschet (1918-2015), since 1954 conducted a systematic investigation of acoustics applied to sculpture, joining elements of art and science, music and plastic arts. His works have been exhibited in the best museums in the world: Guggenheim and MOMA in New York, Barbican in London, MUAC in Mexico City, Chicago, Montreal, Berlin, Munich, Stockholm, Paris, Vancouver, Toronto, Barcelona. Many musicians of the 20th century were inspired by Baschets' sound art works: Pierre Schaeffer, Ravi Shankar, Michel Deneuve, Stomu Yamash'ta, Toru Takemitsu, among many others. They made sculptures with fundamental characteristic of sound components. This search for the sound dimension represented an evolution of sculpture: Rodin at the end of the 19th century take down the sculpture from the pedestal, indicating that sculpture could not only be perceived by view; Brancusi established some tactile parameters in the sculpture, and the Baschet Brothers gave the sculpture a sound component.⁶³

⁶³ Reference from Dr. Josep Cerda's master class of sound art



Figure 4.33&4.34: Sound sculpture of Baschet. (Source: Dr. Josep Cerda's master class of sound art)

Normally, sound art works generate special sound effect always through interactions. This interaction could be realized by people as well as by natural movements like rain, wind or water. In architectural space, the sound art works could be public facilities which people could see, listen and play, attracting people by sound aesthetics as well as fun of interactions. For the elderly, it is an artistic way to catch their attentions and make them participate to feel the passion of life.



Figure 4.35 & 4.36 & 4.37: The elderly and children enjoy playing sound sculptures. Sound sculpture by Baschet. (Source: Dr. Josep Cerda's master class of sound art)

On the other hand, artistic sound installations can also work by interactions with natural movements. Wind, water, rain and other natural elements interact with sound installations, creating attractive and esthetic acoustic effects in space. The acoustic effects always vary by time, materials, shape and natural conditions. It brings interest and special experience of art for the elderly which helps to create positive impressions for the elderly. They could find the charm and vitality of art in their living space.

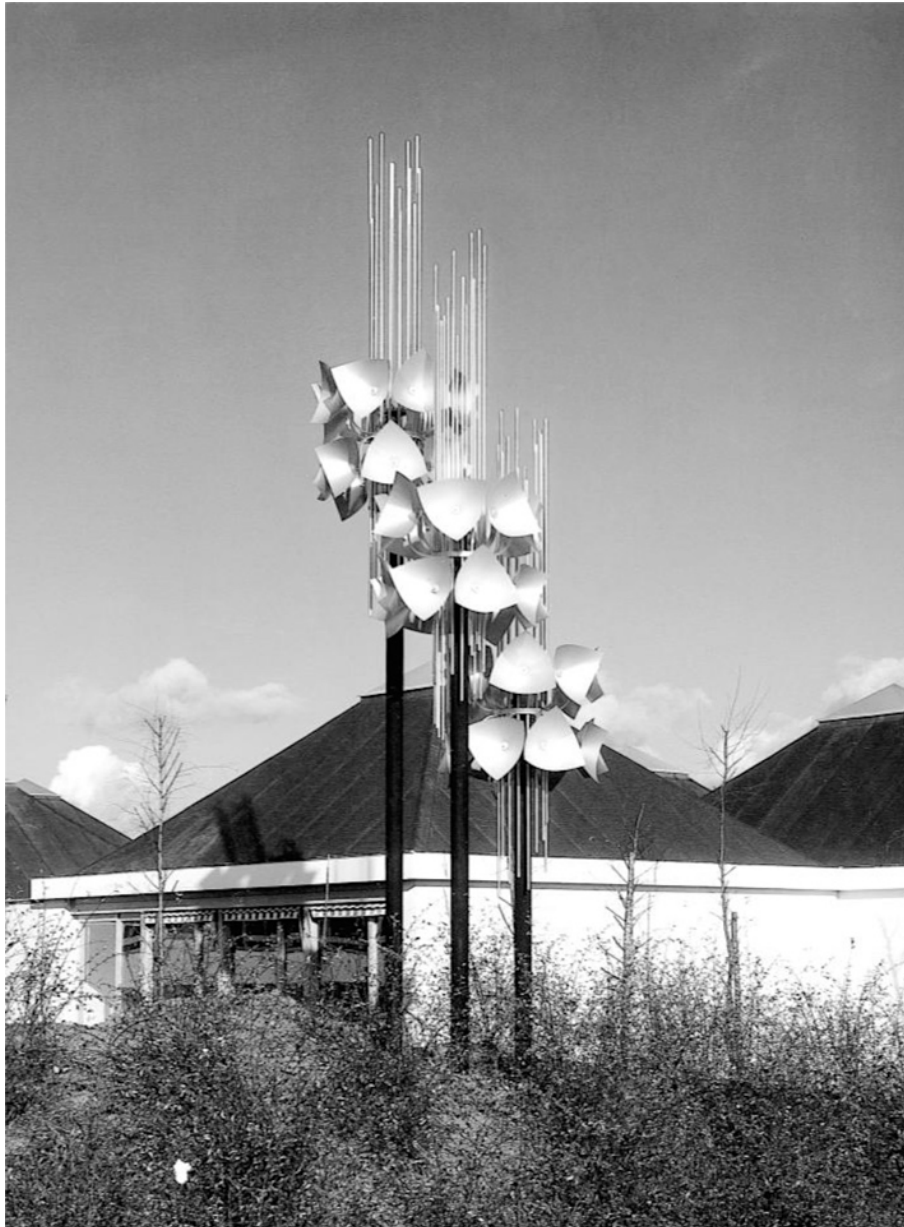


Figure 4.38: Artistic sound installation interacted with wind, generating different artistic sound effects by time. (Source: Dr. Josep Cerda's master class of sound art)

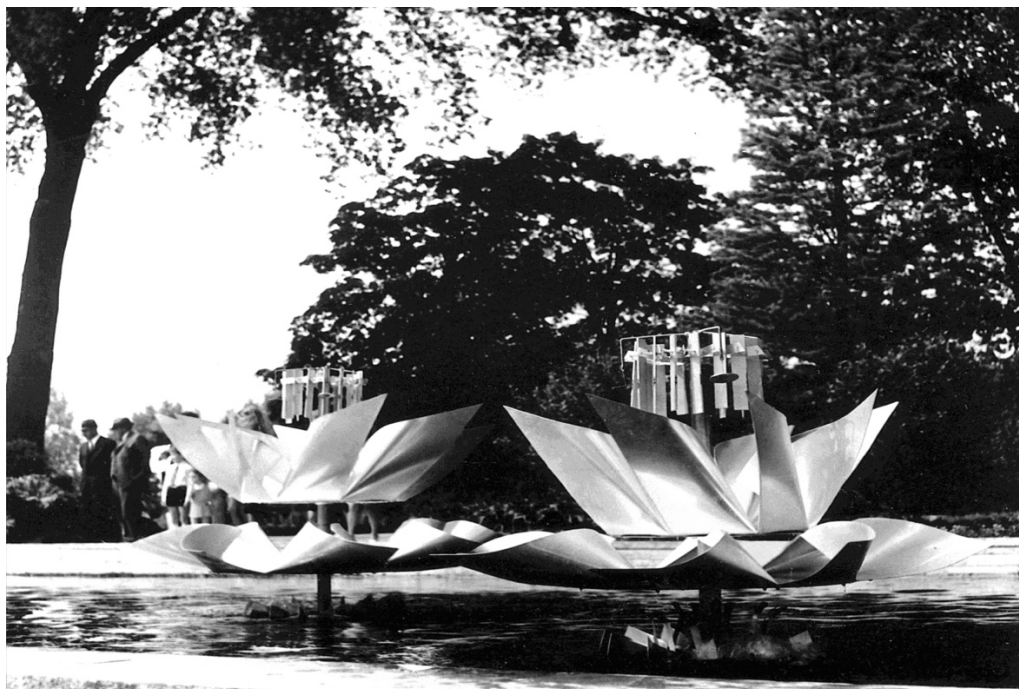


Figure 4.39: Artistic sound installations are combined with fountain design, interacting with water flow
(Source: Dr. Josep Cerdà's master class of sound art)

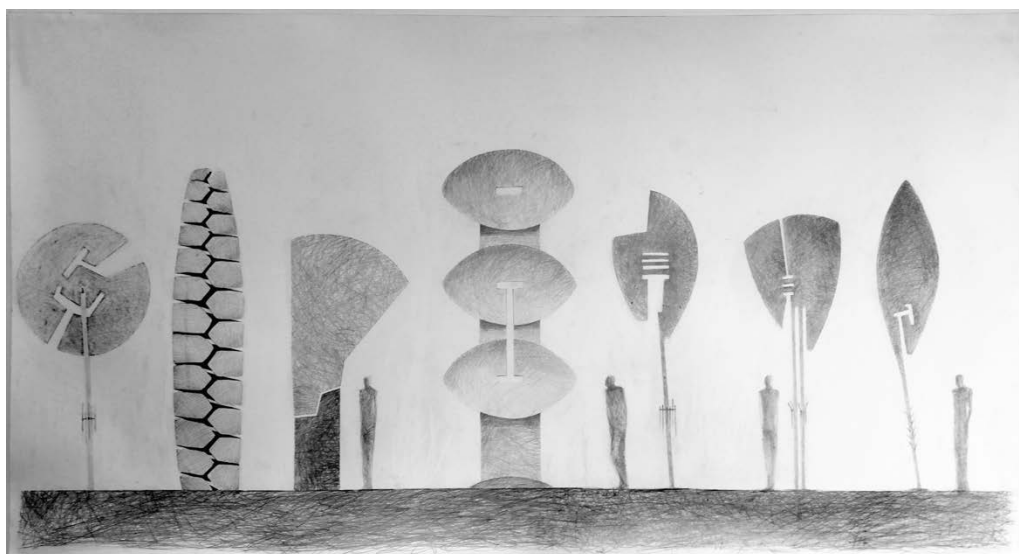


Figure 4.40: Project of artistic sound sculptures in city park of Yichang, China. Sculptures interact with wind to generate artistic feeling of sound. Designed by Dr. Josep Cerdà's. (Source: Sketch by Dr. Josep Cerdà)

Aesthetics of soundscape

Soundscape design refers to use different natural sounds to create esthetic sound environment. For the elderly, they are used to a sound environment of cities, like cars, people, commercials...etc. Compositions of natural sounds, like creek, birds, rains, wind, trees and insects, are attractive and make them relax and pleasant, bringing them back to the nature from busy city life in mental. Soundscape help to emphasize the esthetic feelings of nature, showing the original meaning of living space. In ancient China, architect had already paid attention to creation of soundscape to create poetic living environment with tranquility.

In Chinese traditional gardens, many spaces were carefully designed to create special aesthetics of sound to make people pleasant. Aesthetics-based soundscape design is a unique characteristic for many Chinese classical gardens. 28% of the first collection of poetry in China, entitled “The Book of Songs, 770 B.C. – 476 B.C”, is related to soundscape.⁶⁴ The first monograph on Chinese garden art, Yuan Ye, 1631 A.D., also contains notes on garden soundscape construction. At the end of the last century, the concept of ‘soundscape’, which was proposed by Canadian composer, Schafer Murray, was introduced into China, which refers to the landscape captured by the ear. Western soundscape theory mainly studies the acoustic influence of natural and artificial sounds (sounds including a humanistic connotation), and clear design methods based on acoustic theory can be found within it, which is different from traditional research. This provides a new entry point for the study of the Chinese classical garden design. (Senqi Yang, Hui Xie, Huasong Mao, Tingting Xia, Yu Cheng and Heng Li, 2016.)⁶⁵

Different types of soundscapes are built in different ways. Waterscape can be further subdivided into four forms, namely waterfalls, cascades, streams, and fountains. Depending on the surrounding environment, gardeners usually design water in various forms and use plants, walls, stones or other interface elements to affect the propagation of water sounds, so that it can match the expected artistic

⁶⁴ Shuoxian Wu, 2012. Soundscape described in the book of poetry, *Architectural Journal*, 2012 (S1), 109-113 (in Chinese).

⁶⁵ Senqi Yang, Hui Xie, Huasong Mao, Tingting Xia, Yu Cheng and Heng Li, 2016. “A summary of the spatial construction of soundscape in Chinese gardens.” *PROCEEDINGS of the 22nd International Congress on Acoustics*, Buenos Aires – 5 to 9 September, 2016.

conception more. Taking Yunqin Zhai, a reading place for the emperor in the Qing dynasty, for instance, the sound pressure level of water sound is decreased by reducing the height of falling water, which sounds soft and faint. At the same time, the attraction is surrounded by walls, therefore the water sound propagation is limited by the enclosed space, and external noises are insulated as well. What gardeners did, as said above, not only helps to provide a quiet ambient environment, but also approaches the expected artistic conception. (Senqi Yang, Hui Xie, Huasong Mao, Tingting Xia, Yu Cheng and Heng Li, 2016.)

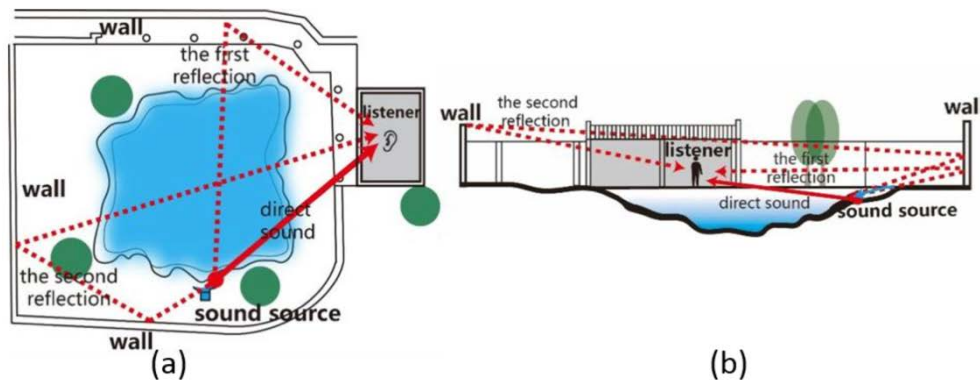


Figure 4.41: Soundscape design in Yunqin Zhai. Different water types generate different sound source, reflecting by plants and creating esthetic and poetic sound environment. (Source: Senqi Yang, Hui Xie, Huasong Mao, Tingting Xia, Yu Cheng and Heng Li, 2016. “A summary of the spatial construction of soundscape in Chinese gardens”. *PROCEEDINGS of the 22nd International Congress on Acoustics*, Buenos Aires – 5 to 9 September, 2016.)

In Zhuozheng park, there is a house named “Tingyu xuan” using to enjoy the rain scene. In front of this house, some green plantain trees are planted to perfect this conception. For the ancient poets and artists of China, the plantain trees were good friends of rain. When the rain hit the leaves of the plantain trees, there would be a romantic sound making people enjoying better the rain. This gardening design is based on the architecture atmosphere to make people experience better the nature.

For the elderly, contemporary elderly housing design need to think about soundscape. The sounds of nature are simple. While listening, their brain can generate corresponding images as if they were staying in nature. The sounds complete their understanding and strengthen their sense of place. This will always help to create necessary artistic impressions and attract the elderly by the natural, comfortable and pleasant atmosphere. The aesthetics of sound art work on mental level, satisfying to depth their hope for home.

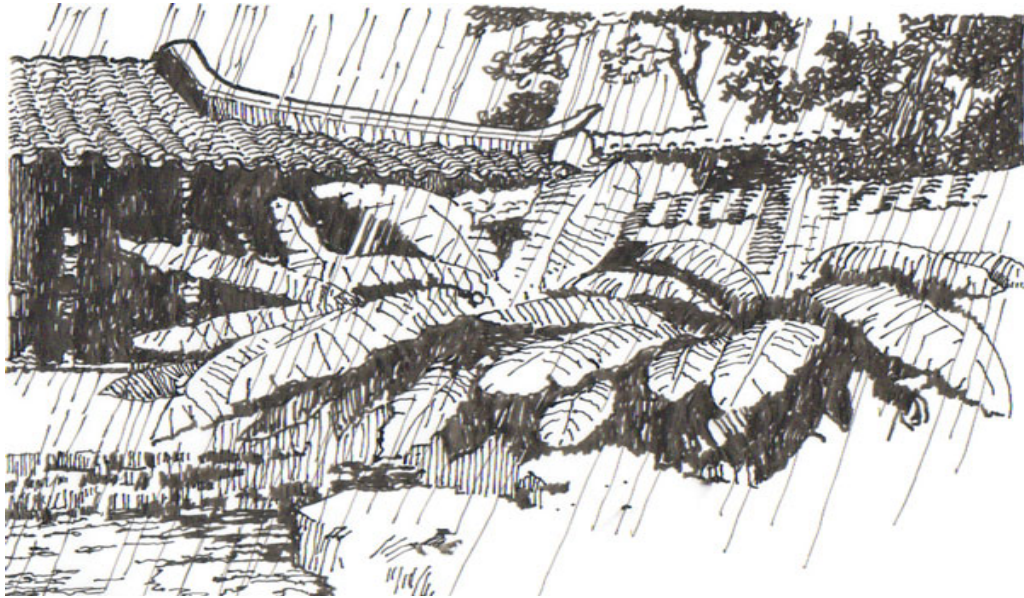


Figure 4.42 & 4.43 & 4.44 The rain scene of House Tingyu Xuan. The plantain trees seen from the inside.
(Source: www.baidu.com)

3.2. Space function and utility

According to Norman's theory, elderly housing space interacts with elderly people's mind from three levels. Architecture appearance attracts the elderly and creates first impressions, telling if they like the space or not related to the visceral level. And then during using process, space function and utility involve in depth with elderly people's feeling to strengthen or change their first impressions. It is involvement of behavioral level, which is related to the function and use experience: whether they feel enjoyable and pleasure during using process. In contemporary elderly housing design, satisfactions of using experience are always associated with their needs of home, that is, sense of safety, staying naturally, happily and freely. Based on these requirements, elderly housing could improve its using experience by completing its function and distribution, facilities and space physical environment.

3.2.1. Function and distribution

Space function and distribution are basic architectural elements that affect the elderly on their using experience. Reasonable function and distribution can give convenience and insurance to daily life of the elderly. To satisfy their mental requirement of living space, architectural functions and distributions of elderly housing should consider from all following parts.

Comprehensive

Elderly housing should provide comprehensive functions to make sure the elderly can live easily and conveniently. It is related to their emotional needs for safe living environment. Especially in Chinese situation, as living in place is becoming the main living pattern in the future, the main focus of elderly housing refurbishing process is to improve the comprehensiveness of community functions. In China, based on the former analysis, most elderly people living in communities without enough supporting functions, as emergency medical point, nursing house, rehabilitation center and public activity space. In elderly housing

refurbishing, completing functions and integrating them into the whole distribution could help the elderly have better using experience of their living space, bringing a deeper emotional touch. It is a base to inject emotional design into contemporary elderly housing refurbishing in China.

For the elderly, apart from living functions, contemporary elderly housing refurbishing should think about other service functions to support daily life and healthcare, including nursing and emergency medical service, social activities space, cultural service and commercial service.

In 2015, Beijing government has put forward design regulations for elderly housing and elderly communities, which made clear requests of the comprehensiveness of functions adapted to elderly people's daily life needs.

Table of Necessary functions for the elderly in different-scale communities
Source: Code for planning of city and town facilities for the aged

| Program | City | Residential Community (Town) | District |
|-------------------------|------|------------------------------|----------|
| Elderly Apartment | ▲ | △ | |
| Nursing Home | ▲ | ▲ | |
| Elderly Care Center | ▲ | | |
| Elderly University | ▲ | △ | |
| Elderly Activity Center | ▲ | ▲ | ▲ |
| Elderly Service Center | | ▲ | ▲ |
| Temporary Nursing Home | | △ | ▲ |

Figure 4.45: Regulations of necessary functions for elderly in living community with different scales.
(Source: Code for planning of city and town facilities for the aged)

These years, in many old residence communities, series methods have already been applied have to improve the comprehensiveness of functions. Architects took advantage of old houses and refurbished them with new functions of medical service, nursing center, library, cultural center and activity center.

From the survey on the supporting functions for the elderly of Beijing Balizhuang Community⁶⁶, apart from living space, many houses are transformed into public

⁶⁶ Zhiqiu Xu, 2016. Research on the Transformation of the Old Residence Suitable for the Elderly Based on the Idea of Continuous Care Community, Beijing University of Technology.

functions to support elderly people's daily life, providing more comprehensive using experience for the elderly. From the distribution, new functions were distributed depend the scale of communities to make sure that they can provide effective service for all the elderly in time. The functions mainly include four parts: daily life supporting organizations which provide basic service for the elderly; cultural and activity center which satisfy elderly people's need of social communications; nursing and medical service for healthcare; and commercial center as restaurant, shops, supermarket.

Comprehensiveness of functions in contemporary elderly housing process could provide a base for elderly people's daily life, making sure they can live safely, naturally and freely. It is the foundation of good using experience.

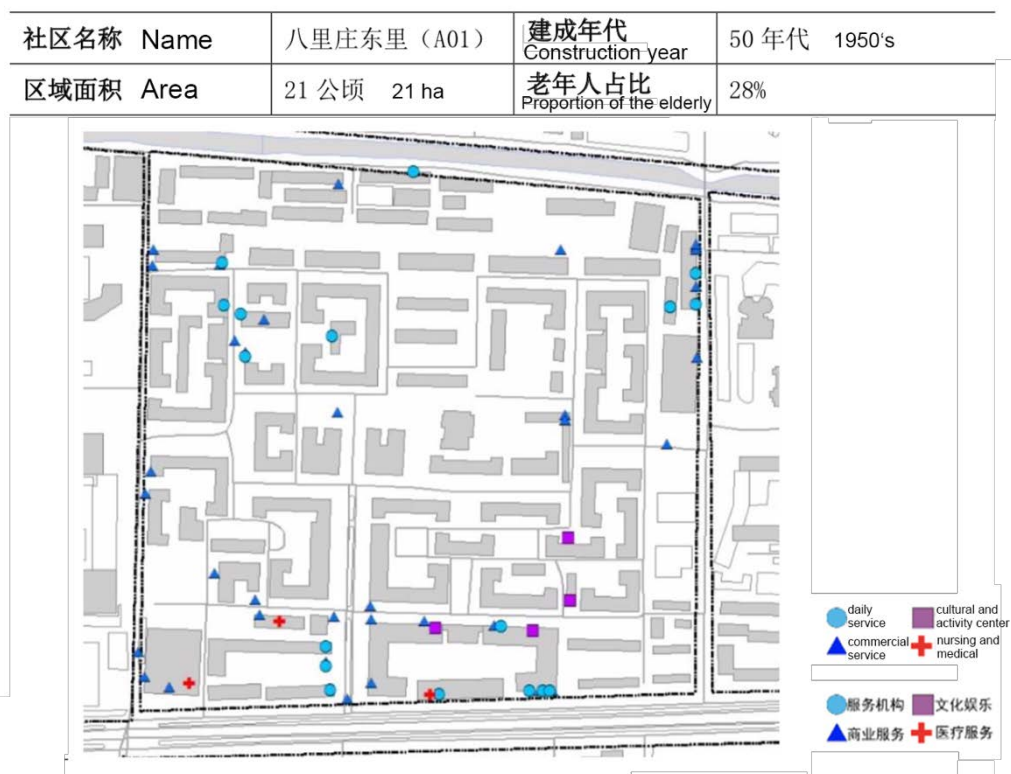


Figure 4.46: Distribution of functions after renovation of Balizhuang Community. Functions are more comprehensive for the elderly. (Source: Zhiqiu Xu, 2016. Research on the Transformation of the Old Residence Suitable for the Elderly Based on the Idea of Continuous Care Community, Beijing University of Technology.)

Flexible and adaptable

Contemporary elderly housing distribution should be flexible and adaptable respecting to elderly people's daily life. In China, according to the former analysis, aging in place will become the main aging pattern. Most Chinese elderly would like to live in their original home. While space requests would change in different life periods. This inevitably requires flexible architecture distributions to ensure that space could always meet their needs in different periods. On the other hand, faced to Chinese situations, the elderly prefer aging in place always with their families. However, the elderly always have different life habits from young people. Architecture distribution should be considered to satisfy their desire of living with their families while having their own independent space.

In 1992, the English Joseph Rowntree Foundation complete the flexible elderly house model named lifetime home.

“Lifetime Homes are all about flexibility and adaptability; they are not ‘special’, but are thoughtfully designed to create and encourage better living environments for everyone. From raising small children to coping with illness or dealing with reduced mobility in later life, Lifetime Homes make the ups and downs of daily living easier to manage.” — English lifetime home design organization.

This lifetime home model provides a flexible and adaptable house model which could be change depend on different life habits and living requests. It is a house model faced to aging in place pattern. This lifetime home model is designed following the physic change of people, to leave possibility of space renovation adapted to different periods of human beings. Besides of accessibility, this living model helps to keep the high emotional environment of home sense, which avoids the fear and anxiety about the new strange environment.

In China, similar house model had been put forward by Chinese architect Yigang Peng. In his book *“The organization of architectural space”* (Peng Yigang, 1983), he introduced some examples of the lifetime flat.

In this house model, all the walls can be changed or removed. The small flats can be combined with the demolition of the wall in the middle. And the walls of washrooms and kitchens also can be easily changed to get more space to meet life requests and family scales. These changes are quite adapted to the lifetime home concept: people become older and families become bigger. The combination of small single flats helps solve the problem of family expansions, providing a both connected and independent space for the elderly and their families and satisfying their needs of privacy as well as together with family. The elderly hope that they can be accompanied by their families, but also have their own independent spaces to make them feel both safe and free. In this case, we can only remove some parts of walls between two flats to get necessary communications without destroying their private space in every flat. And for those who would like to stay with their families all time, they can remove all the walls to merge the two spaces completely.

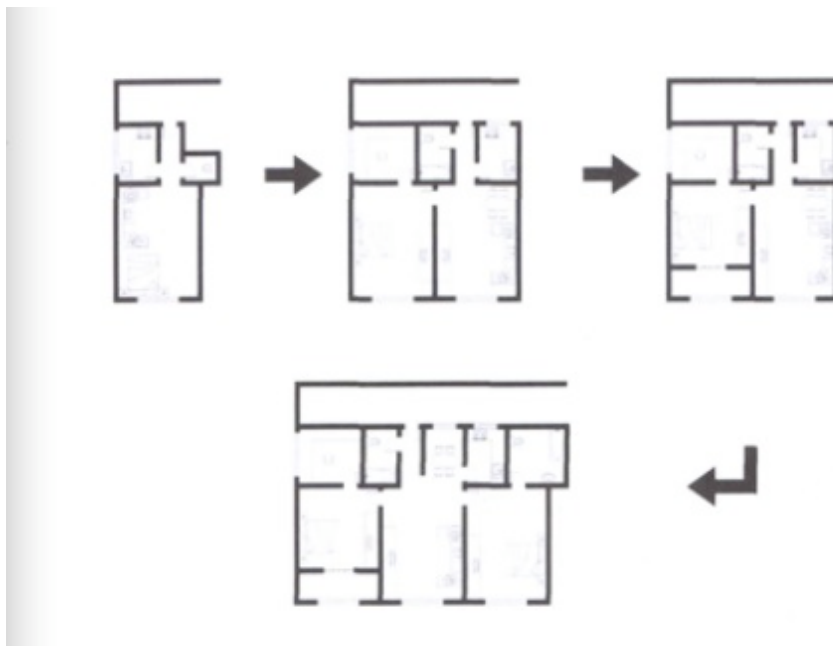


Figure 4.47: Flexible and adaptable home model, satisfying different requests of space in different life period. On the other hand, it provides possibility for different families. Home scale could be change depend families. Family members can live together as well as enjoying their independent space. (Source: Yigang Peng, 1983. *Organization of architecture space*, China Architecture Industry Press.)

Public space

Human always have their social characteristics. They need to attend social activities to communicate with others and express their own social value. Living space, as said before, is a place with sense of safety, natural and free as well as showing their personal identities of the proprietors. Public space is necessary for the elderly to provide them possible social interactions, with purpose of enriching living experience and showing personal value. It is a result of elderly people's desire for social activities. The elderly could find their life meanings and values from social activities, avoiding negative feelings of loneliness and hopelessness.

Public space can have different kinds of functions to enrich elderly people's life. In Chinese contemporary elderly housing refurbishing process, renovations of public space in different scales and functions adapted to elderly people's using requirements are necessary and important. Compared, European countries have always paid much attention to public space both in urban and in housing design. And their experience could be helpful in Chinese cases.

In the Santa Rita Geriatric Center in Spain, all the rooms have direct access from (and towards) a garden that, as a sort of 'lobby', forms the main public natural space of the whole architecture. All people living here can easily enjoy the activity and communication in a natural environment.⁶⁷



Figure 4.48: The main public patio, Santa Rita Geriatric Center, Spain, Manuel Ocaña (Source: Manuel Ocaña, 2003. "Santa Rita Geriatric Center", *Archidaily*.)

⁶⁷ Text description provided by the architects. <https://www.archdaily.com/24725/santa-rita-geriatric-center-manuel-ocana>

Between the residential area and the polygonal perimeter emerges an open, interconnected, fluid, flat and unusual space that accommodates at once the different programs and circulation uses. These areas form many public spaces with different shapes, sizes and functions. Going over the whole building means traversing a space with neither doors nor corridors, establishing paths that do not necessarily entail a single solution. It is a ‘polyatmospheric’ circulation space: a series of events that can stimulate the senses and ease the disorientation and spatial tedium that one can ‘experience’ in a geriatric center.



Figure 4.49 &4.50: Different public space, Santa Rita Geriatric Center, Spain, Manuel Ocaña (Source: Manuel Ocaña,2003. “Santa Rita Geriatric Center”, *Archidaily*.)

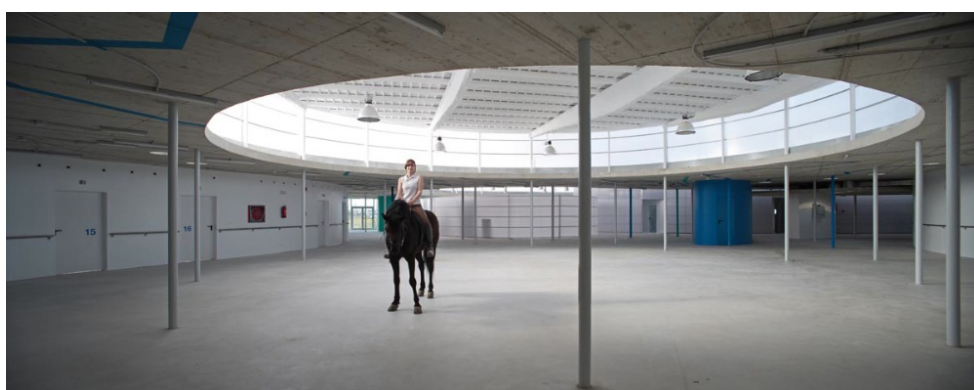


Figure 4.51 & 4.52: Different public space, Santa Rita Geriatric Center, Spain, Manuel Ocaña (Source: Manuel Ocaña, 2003. "Santa Rita Geriatric Center", *Archidaily*.)

Different public places enrich the life of the elderly, providing them a lot of choices to spend their leisure time. It is very useful to excite their passion for life making them realize that they can also have a shining life to show their worth.

In Chinese cases, urban public spaces are often seen in big scales which would make the elderly feel unsafe. In Chinese old residential zones, there is a lack of public space. The elderly always has to take bus to the park to take activities, which is inconvenient for their life.

In the survey of Yanmin Zhou, we can see clearly this problem. She said:

“The old people always like taking activity in group in the park or square rather than in the residential area. It is because that the old residential area doesn’t have enough public space to meet their need. (...)The Fitness equipment in the park always ignores the physic ability of old people. Some kinds of the equipment are difficult for old people to use. And the walking path always stays in the sun without trees that is very uncomfortable in summer. What’s more, some pavement patterns focusing on form with special materials are always very difficult for old people to use and also exists the potential danger. It’s better to choose the smooth pavement made of cement or asphalt to meet the need of old people.”

Facing to Chinese aging in place cases, in the refurbishment process, different urban public space can improve the life qualities and living experience for the elderly. On this part, European experience could help a lot. In European cities, urban public spaces are always humane sized and decorated with some accessible facilities like armrest, which create a friendly atmosphere to attract old people.

Barcelona has a special characteristic of urbanism which shows their high attention to public space. The plan Cerdà put forward special architecture model named “ensanche”, which always had a patio in every living block, providing a quiet and comfortable public space for residents. Although with the increasing populations, many public patios are occupied by illegal constructions, Barcelona government has already started to recover the patios to the original concept.

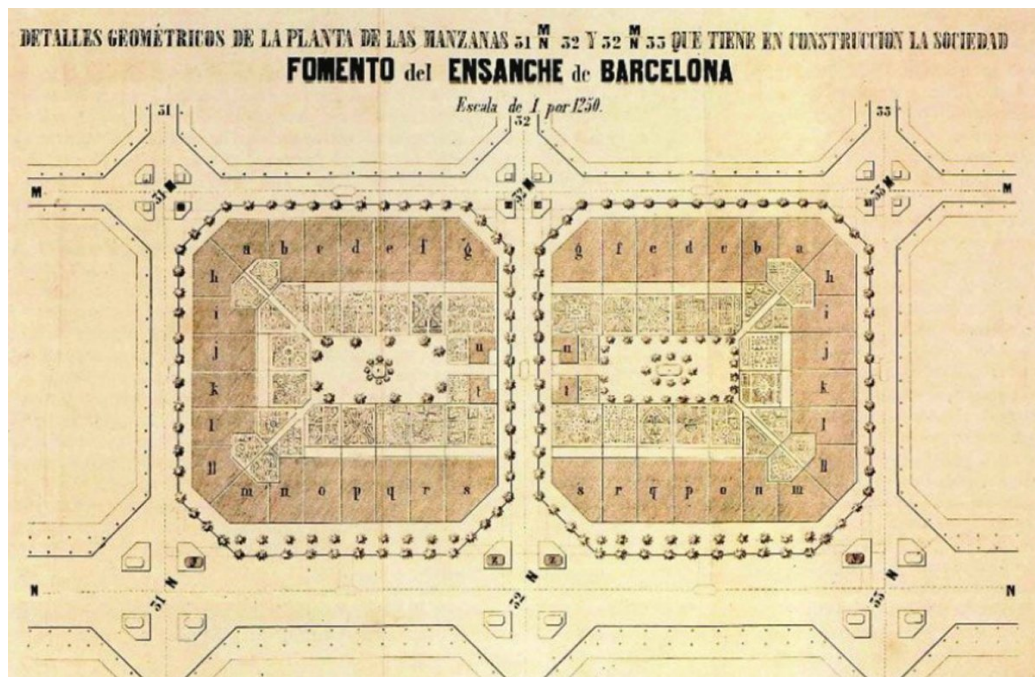


Figure 4.53: Architecture block “ensanche” of Barcelona. Every block has a public garden inside with flats around. (Source: “Plan Cerdà”, Wikipedia.)



Figure 4.54: Public garden Jaume Perich inside block. (Source: http://www.barcelonaenhd.com/fotos-articulo_perderse-barcelona-interiores-manzana-leixample-1962999)

Space induction

Due to the physical conditions of the elderly, induction of space distribution has special importance and meaning for using experience. Many old people are suffering from the problem of forgetfulness, especially for those who have disease as Alzheimer. Space induction can help the elderly strengthen their memories and remember the circulations more easily, which can give convenience to their daily life, avoiding the trepidations of getting lost.

Color is always considered as the most common and effective element for space induction. In the study by Spence, Wong, Rusan, and Rastegar, 120 participants viewed a sequence of images of natural scenes on a computer monitor. The participants were either shown colored scenes or gray scale scenes. The same scenes were then shown again, either in color or in gray scale. The participants were asked to rate the scenes as old or new. Spence et al. (2006) found that color increased the recognition of the natural scenes by approximately 5%.⁶⁸ For the elderly, different colors can promote their memories.

In Sant Andreu elderly housing in Barcelona, different colors have been painted on the walls, making the space more lively and vivid. The colorful environment helps to inspire old people and excite their passion to life. What's more, it is also a sign for different functions, which avoids the anxiety and panic of getting lost.

⁶⁸ Lynnay Huchendorf, 2007 "The Effects of Color on Memory." UW-L Journal of Undergraduate Research X



Figure 4.55 & 4.56: Different space are painted in different colors with guiding functions for the elderly. Sant Andreu elderly house, Barcelona, Lluís Bravo. (Source: Sinablog of Zhou Yanmin Studio.)

Connection to nature

Nature, besides its aesthetic attraction in visceral level, also works to provide better using experience for the elderly. Nature and outdoor environment have important effects of promoting well-being, reducing stress, improving cognitive functions and activating good memories. (Håkon Johansen& Marianne Thorsen Gonzalez, 2018)⁶⁹ Living space should stay in harmony with nature to make itself an organic part of nature This harmony brings the elderly a sense of staying natural and freely during their using experience, which creates home sense for them.

In the Elderly Housing Project in Chur Switzerland of Peter Zumthor, he treated the architecture and the natural forest as a whole, constructing harmonies between space and nature, both seen in from architecture distribution and functions. His architecture space seems like growing from the natural environment and being an extension of nature.

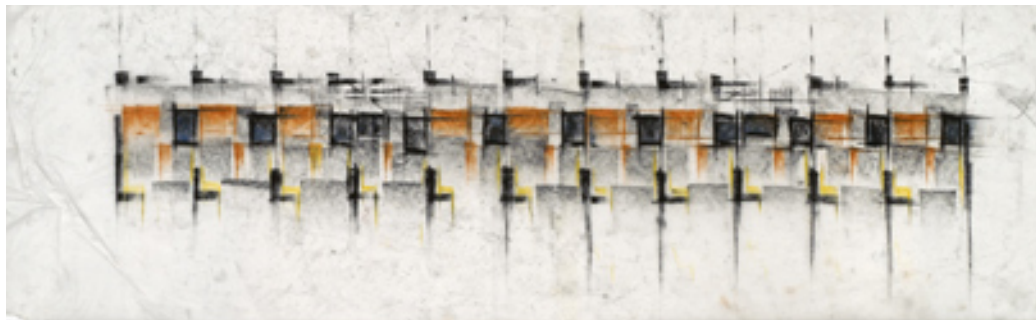


Figure 4.57: Idea of Plan, Elderly Housing Project in Chur Switzerland, 1993, Peter Zumthor (Source: <https://www.dezeen.com/2009/04/18/key-projects-by-peter-zumthor/>)

⁶⁹ Håkon Johansen& Marianne Thorsen Gonzalez, 2018. "Being in contact with nature activates memories and offers elderly people in nursing homes beneficial experiences". Sykepleien, 2018,06,04. <https://sykepleien.no/en/forskning/2018/06/being-contact-nature-activates-memories-and-offers-elderly-people-nursing-homes>



Figure 4.58: Architecture always has a good relationship with nature. Elderly Housing Project in Chur Switzerland, 1993, Peter Zumthor (Source: Rose Etherington, 2009. "Key projects by Peter Zumthor." *Dezzen*, 2009, April 18.)

The big windows facing the forest introduce the beautiful view into the room. And the balconies on the other side give opportunity to get close to nature in the sunshine. The elderly can easily go into natural environment to take activities or enjoy the sunshine.



Figure 4.59: The big windows and the balcony (Source: Rose Etherington, 2009. "Key projects by Peter Zumthor." *Dezzen*, 2009, April 18.)



Figure 4.60: The big windows and the balcony (Source: Rose Etherington, 2009. "Key projects by Peter Zumthor." *Dezzen*, 2009, April 18.)



Figure 4.61: Architecture space connect with nature, providing positive using experience for the elderly. (Source:<http://www.panovscott.com.au/wp-content/uploads/2012/11/Home-for-the-Elderly-Peter-Zumthor.jpg>)

Similar concept could be seen in the project of Senior Center in Lich Germany, Pfeifer Kuhn Architekten. The whole architecture is made of wood, creating a pure natural space. In architectural distribution, architectural spaces are connected by patios and faced to the outside forest, which extends the nature into the interior space. There are some gaps between wood sheets making the architecture breath. The wooden wall is a connection between the interior space and the nature, which can penetrate in the form of view, air, light and sound, through the space among woods. The elderly could enjoy in the pure natural experience while using the space.



Figure 4.62: Plan of Senior Center in Lich Germany, Pfeifer Kuhn Architekten. Architecture space are connected by natural patios and faced to the outside forest. (Source: BaruccoPfeifer Architektur,2003. "Service Centre for the elderly", *German-architects*.)



Figure 4.63: Architecture always connects to nature. (Source: BaruccoPfeifer Architektur,2003. “Service Centre for the elderly”, German-architects.)

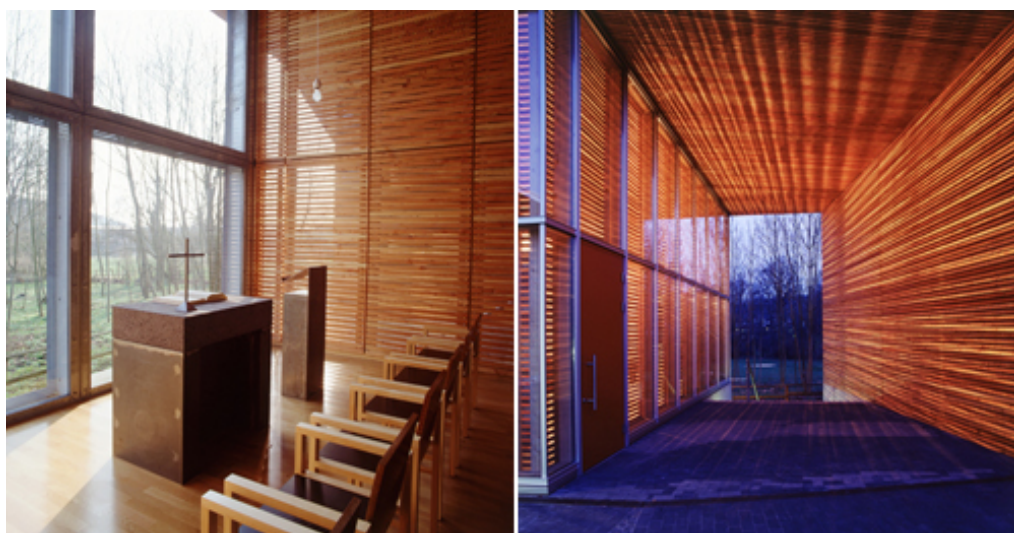


Figure 4.64: The wood wall, Senior Center in Lich Germany, Pfeifer Kuhn Architekten (Source: Barucco Pfeifer Architektur,2003. “Service Centre for the elderly”, *German-architects.*)

In Chinese big cities, because of big populations and the lack of land, the residential buildings are always a tall concrete tower, including many elderly residential areas. Besides the unsafe feeling, the elderly living in the tall floors are far from the nature, breaking the harmony between architecture and nature. In this situation, during the refurbishing process, European experience could be studied. Nature could be introduced to the inner space, as doing in St. Pölten Pensioner and Nursing home, to create a combination between architecture and nature. In St. Pölten Pensioner and Nursing home, a natural garden is distributed inside architecture space. Illuminated by the skylight, the tapering shapes created by the stretched cables, supporting climbing “passion-flowers”, evoke the image of green natural sculptural object. People here can have natural living experience in this building.



Figure 4.65 & 4.66: Inner garden is distributed to make a natural atmosphere. (Source: Reinberg Architecture studio.)

3.2.2. Facilities

Accessibility

Faced to Chinese aging situations, aging in place will become the main living pattern in the future. In the refurbishing process, the accessibility renovation is very important to provide a safe living environment. It is one of the most basic using requirement of elderly housing. Accessibility shows the humanistic care for the elderly. According to Roseann Henry's study, he has put forward several principles for accessibility refurbishing of elderly housing.

Easy on the Hands. You probably don't think much about turning a doorknob, but it can actually be quite a chore, even painful, for someone with arthritis or other conditions. Simply replacing doorknobs with lever-style hardware can make life easier for residents. Levers are also best on faucets, and illuminated rocker switches are better than the standard toggle light switches.

Friendly Floors. Slippery surfaces are not the only danger underfoot, although they're the most obvious. All floors should be made slip-resistant, such as by adding nonskid mats under area rugs (or getting rid of the area rugs completely). Trips are as dangerous as slips, so eliminate trip points like thresholds wherever possible, or reduce their height. For those who use walkers, adds Cratsley, low-pile carpeting is safest so the walker doesn't catch on deep pile and cause a fall.

Safe Stairs. For older people living on more than one level, stairs can be especially dangerous. Handrails are a must, on both sides of the staircase if possible. Lighting is also critical, says Cratsley, so make sure the entire stairway is well lit from top to bottom. Clearly defined steps that show where the edge of the tread is can help prevent falls.

Landing Places. Fumbling with keys, packages, the mail — all can distract and unbalance someone entering or exiting a home. In addition to providing lighting at entryways be sure to have a table, bench, or other surface nearby for putting things down.

Better Baths. Most people think of shower grab bars as the way to make bathing safer. There are other ways to help ensure safety in the bath, says Cratsley. Think about adding grab bars by the toilet, too, or other places in the room where someone may need a helping hand. A step-in shower is safer than a tub, but if that's not possible add grab bars that help someone getting in and out. A single-handled faucet control reduces the chances of scalding at the sink, and a pressure-balanced control does the same in the shower. A hand-held showerhead is often easier to use for someone with limited mobility than a fixed showerhead.

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In the research “Elderly Facilities Abroad: Development History and Design Trend”⁷¹, Zhou Yanmin has also made some studies about accessible renovations in connection with Chinese elderly housing refurbishing process. The common problem of living room in Chinese old residence is that it always too small to use. We can add some armrest to support the daily life of the elderly. The material of floor should be changed to non-slip.

The problem of kitchen is also its small space, especially for those in wheelchair. For this, they can put some cookers in the balcony out of the kitchen to get an available using space. It's necessary to put signs on the switches of water heaters and gas system to avoid the dangerous situation occurring for forgetting turn off the switch. The size and form of cookers should pre-consider the accessibility of people in the wheelchair.

⁷⁰ Roseann Henry. “6 Ideas for Elder-Friendly Design :Smart ways to update a home for the not-so-young.” *This Old House.com*

⁷¹ Zhou Yanmin&Lin YIjing, 2015. “Elderly Facilities Abroad: Development History and Design Trend”, *World Architecture*, 201511, P16-21.

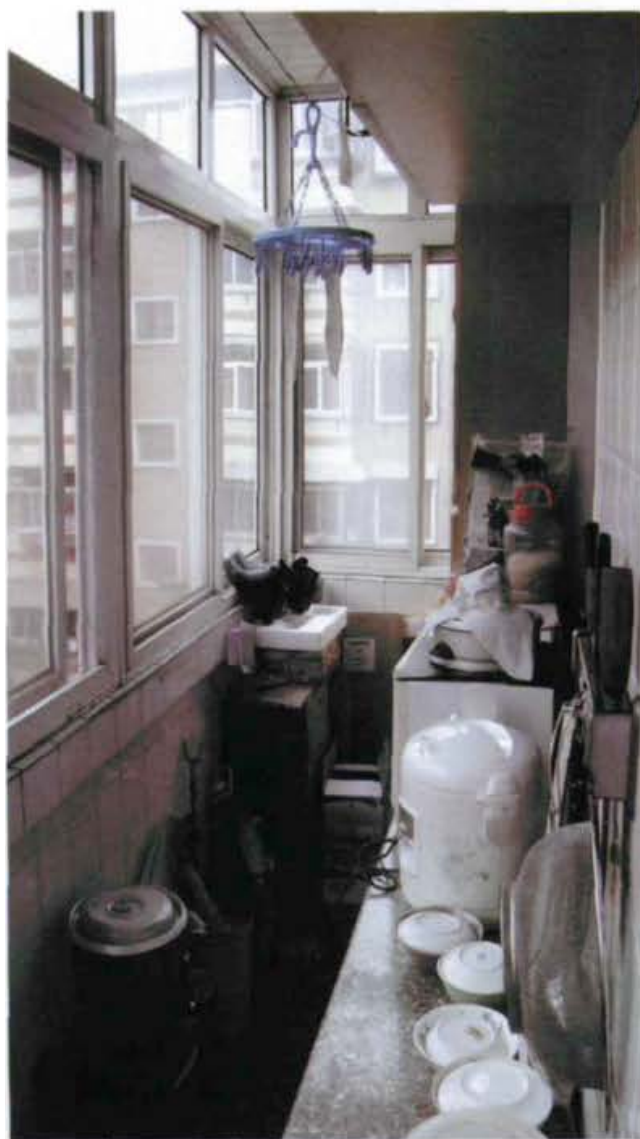


Figure 4.67: narrow kitchen in old residence. (Source: Zhou Yanmin&Lin YIjing, 2015. “Elderly Facilities Abroad: Development History and Design Trend”, *World Architecture*, 201511, P16-21.)

As a high frequency used space, the bathroom is an important space to renew. Firstly, the height different of floor should be removed and the size of the door should be increased. Sliding doors can be used to save space. The material of floor should change to the non-slip ones. The light system can be changed to the voice-controlled ones. Armrest is necessary around the potty and bathtub. The inner washroom can be added into the old dormitory to give convenience to old people. Emergency call system can be used to make sure the safety of old people.

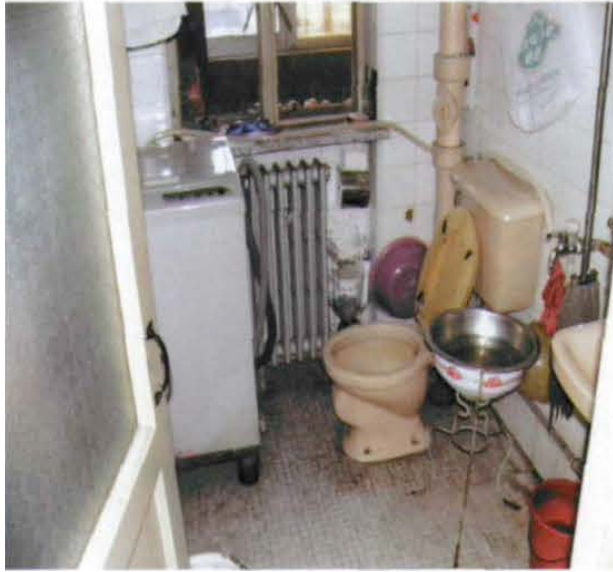


Figure 4.68: bathroom situation in old residence. (Source: Zhou Yanmin&Lin YIjing, 2015. “Elderly Facilities Abroad: Development History and Design Trend”, World Architecture, 201511, P16-21.)

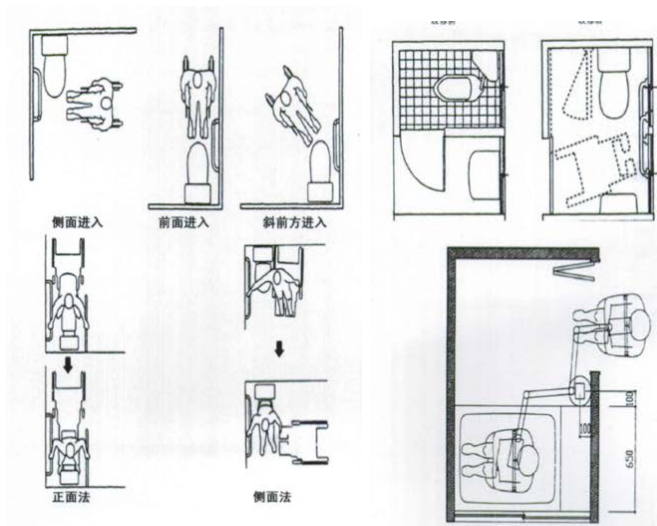


Figure 4.69: Accessible refurbishment of bathroom. (Source: Zhou Yanmin&Lin YIjing, 2015. “Elderly Facilities Abroad: Development History and Design Trend”, World Architecture, 201511, P16-21.)

Smart home technology

With the development of technology, smart home is becoming a trend for contemporary elderly housing refurbishing. Smart home is a regular home which has been equipped with different intelligent facilities. It brings a more convenient, comfortable and safer life to the elderly, as well as for assessing the cognitive and physical health of the residents⁷². It could improve the using experience during elderly people's daily life. In Chinese situations, applications of smart home concepts could support the contemporary elderly housing refurbishing, creating more possibilities to live independently for the elderly who prefer aging in place model.

During these years, many projects have been done to improve smart home design in elderly housing, which have contributed a lot to the development of smart home and technology of intelligence. Today, many new elderly housings have already equipped with their research results to provide better life qualities for their residents. The following table, which was put forward by IEEE members Parisa Rashidi and Alex Mihailidis in their survey on Ambient Assisted Living Tools for Older Adults (2012), has summarized several smart home projects aimed at assisted living.

⁷² Parisa Rashidi, Alex Mihailidis, 2012. "A Survey on Ambient Assisted Living Tools for Older Adults", *IEEE TRANSACTION ON INFORMATION TECHNOLOGY IN BIOMEDICINE*, VOL. X, NO. X, JUNE 2012.

TABLE II: Assistive smart home projects.

| Project | Institution | Reference |
|--------------------|--------------------------|----------------|
| Aging In Place | U. Of Missouri | Ranz [17] |
| Aware Home | Georgia Tech | Abowd [19] |
| CareLab | Germany | Nick [23] |
| CareNet(MIDAS) | U. of Wales, UK | Williams [24] |
| CASAS | Washington State U. | Cook [16] |
| DOMUS | U. de Sherbrooke | Giroux [21] |
| Elite Care | OHSU | Adami [18] |
| ENABLE | Netherlands | Van Berlo [25] |
| Gator Tech | UF | Helal [26] |
| HIS | Grenoble U., France | Noury [27] |
| MavHome | U. of Texas at Arlington | Cook [28] |
| Millennium Home | Brunel U. | Perry [29] |
| ProSAFE | LAAS, France | Chan [30] |
| SELF | ETL, Japan | Nishida [31] |
| Smart Medical Home | Rochester U. | Allen [32] |
| Ubiquitous Home | UCG, Japan | Yamazaki [33] |
| WTH | JMITI, Japan | Tamura [34] |
| - | UNSW, Australia | Celler [35] |

Figure 4.70: CASAS project at Washington State University provides a noninvasive assistive environment for dementia patients at home. The “Aging in Place” project at University of Missouri aims to provide a long term care model for seniors in terms of supportive health. Elite care is an assisted living facility equipped with sensors to monitor indicators such as time in bed, bodyweight, and sleep restlessness using various sensors. The Aware Home project at Georgia Tech, employs a variety of sensors such as smart floor sensors, as well as assistive robots for monitoring and helping the elderly. Other notable smart home testbeds include DOMUS at University de Sherbrooke, and House n project at MIT. Some smart home projects in Europe include iDorm, Grenoble Health Smart Home (HIS), Gloucester Smart House, PROSAFE, ENABLE and CareLab. There are also related joint initiatives such as the “Ambient Assisted Living Joint Programme” (AAL JP) supported by the European commission with the goal of enhancing the quality of life of older people across Europe through the use of ambient assisted living technologies. In Asia, also some smart home projects have been developed, such as the early “Welfare Techno House” (WTH) project, which measured indicators such as ECG, body weight and urinary volume using sensors placed in the bathroom and bathtub. The Ubiquitous Home project is another smart home project in Japan, which uses PIR sensors, cameras, microphones, pressure sensors, and RFID technology for monitoring the older adults. For a more thorough review of the smart home technology, refer to related survey papers. (Source: Parisa Rashidi, Alex Mihailidi, 2012. A Survey on Ambient Assisted Living Tools for Older Adults, IEEE TRANSACTION ON INFORMATION TECHNOLOGY IN BIOMEDICINE, VOL. X, NO. X, JUNE 2012.)

Based on these investigations, the realizations of smart home are mainly relying on the sensor system and network technology to supervise house environment as well as elderly people's health conditions and then make timely adjustments or communications with related assistants, always providing a safer, more helpful, convenient and comfortable living environment for the elderly. Now the most common and mature smart home technologies mainly include the following aspects.

Firstly, the system of security alarm is always equipped to prevent danger and to ask for help in emergency cases. Combined with sensor system, automatic security alarm could always supervise and make notification in emergency cases as fire, gas leak, providing insurance for independent elderly. And the elderly could also use to contact with outside when they need help. Secondly, home appliances controlling system can allow the elderly to use their home appliances more easily through wireless network, as air conditions, televisions, telephones. Now in smart home, the elderly can control through applications of mobile phones. But there are already many investigations on the body sensors system. In the future, the elderly can even use and control the home appliances just by body sensors. Thirdly, the physical environment supervision and adjustment system is the most basic and common facilities in today's smart home. It can supervise the physical conditions of interior environment, like humidity, temperature, light and ventilations, and make suitable adjustment depending on health conditions of the elderly. Fourthly, smart communication system, like smartphone, smart bells with camera and videos, and other intelligent facilities, is providing a more interactive and convenient lifestyle for the elderly.⁷³

⁷³ Reference from: Li Jian, 2001. "Development of intelligent elderly housing", *Housing technology*, 2001,5. Shanghai.



Figure 4.71: Today's common and mature Smart home technologies which are equipped in advanced contemporary elderly housing. (Source: futureforall.org)

Besides, now robot and artificial intelligent assistants have already received great developments and started to be applied in some smart home. *“Assistive robots allow the older adults to overcome their physical limitations by helping them in their daily activities. Assistive robots can be categorized into 3 categories: robots assisting with ADL activities, robots assisting with IADL activities, and robots assisting with EADL activities. Activities of Daily Living or ADL tasks include self-maintenance activities, such as feeding, dressing, grooming, etc. Instrumental activities of daily living or IADL tasks include the ability to use instruments in daily living, such as the successful use of the telephone, preparing food, etc. Enhanced activities of daily living (EADLs) include participation in social activities, such as engaging in hobbies.”* (Parisa Rashidi, Alex Mihailidi, 2012). The development of robotic and intelligent assistant technology has offered more insurance and help for the elderly who live alone. It can work effectively to take care elderly people's daily life, reducing the time burden of family members. But now this technology is still developing. The high cost and lack of maturity and comprehensiveness of technology are still problems to be solved in the future.

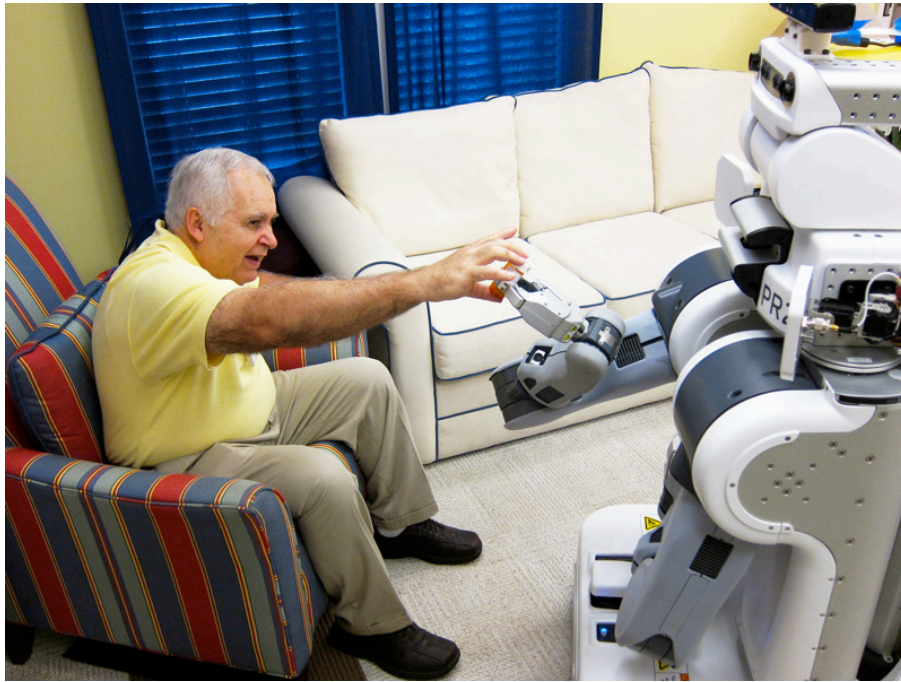


Figure 4.72: A robot hands a medication bottle to a person. Photo credit: Keith Bujak. Source: Georgia Tech News Center (Source: NURSEBOT: PERSONAL MOBILE ROBOTIC ASSISTANTS FOR THE ELDERLY. Design to improve life, 2011,9. <https://designtoimprovelife.dk/nursebot-personal-mobile-robotic-assistants-for-the-elderly/>)



Figure 4.73: NURSEBOT. This personal mobile robotic assistant can help the elderly with daily tasks, provide companionship and even help them to remotely communicate with physicians and caregivers. The NurseBot combines leading edge research in robotics, artificial intelligence, interaction design, health care, and social science and psychology to deliver functions such as Intelligent Reminding, Tele-presence, Data-collection and Surveillance, Mobile Manipulation, and Social Interaction. (Design to improve life, 2011, 9. (Source: NURSEBOT: PERSONAL MOBILE ROBOTIC ASSISTANTS FOR THE ELDERLY. Design to improve life, 2011,9. <https://designtoimprovelife.dk/nursebot-personal-mobile-robotic-assistants-for-the-elderly/>)

3.2.3. Comfort of physical environment

Physical environment is another aspect that affect much on using experience of elderly housing. Physical environment of living space including temperature, ventilation, light and acoustic conditions, could affect the elderly on their health conditions and further generate great influence on their using feelings and emotion. Comfortable physical environment can provide a safer, healthier and happier life to the elderly, improving directly their life qualities. In Chinese contemporary elderly housing refurbishing process, apart from applications of technologies, architecture methods could be also used to create a better physical environment.

Temperature, ventilation, humidity and natural light

Temperature, ventilation, humidity and lighting are factors which could make interactions on each other. Architecture with better ventilation and lighting could adjust interior temperature and humidity and provide health living environment. Refurbishment to improve temperature, ventilation, humidity and lighting conditions in contemporary elderly housing is one of the most basic and meaningful things associated with elderly people's requirements of housing in aging in place model. It is results of the poor living conditions of old city centers in China as well as in all the historic cities in the world. Barcelona also had this problem and the experience of refurbishing could be introduced to the contemporary elderly housing design in China. The old city center of Barcelona, Ciutat Vella, is one of the most intensive areas in the word, where the streets are narrow with high buildings beside. People had to suffer from the bad life qualities with little light, bad ventilation and crowed noisy public space.

In 1992, the whole city had the chance of contemporary rehabilitations for the Olympic games. Government cooperated with many architects to make plan of refurbishing, aiming at improving life qualities of the old city center.

Among the refurbishing projects of housing, Residence Cambó, which was designed by Luis Bravo, is a representation. Respecting to the original city texture and life style, this project has improved the ventilation, natural light conditions by architecture rehabilitations which creates a better life quality for residents.

“The project deepens in an integrating urban idea with the will to assimilate the historical dynamics of the neighborhood and at the same time satisfy the needs and aspirations of its inhabitants.

A study of daily life allowed to establish the guidelines of the project. In this way, sanitation, sunlight, ventilation, privacy and the spatial quality of the interiors were substantially improved, far surpassing the residential typology of the neighborhood. The visuals were enhanced and controlled natural lighting was favored, creating physical and psychological comfort in the interiors as well as connectivity and quality in the public space.

All this emphasizes the will to respect the peculiar character of the area, both in its urban image and in its sociological and vital environment aspects.

Far from any historicist mimicry, it was about capturing and reproducing elements that allowed it to be in tune with the compositional themes and rhythms characteristic of the place. Based on this idea, current reinterpretations of traditional elements such as the balcony or the latticework were made.

In short, a dialoguing architecture that manages to merge harmoniously with the rich urban fabric of Ciutat Vella. Using a radically contemporary language that allows the integration of variety and diversity, the main qualities of the neighborhood.” (Description by architect)

In this project, some volumes selectively removed with respects to original urban images. Small patios, which were connect with outside, were opened inside the whole building, allowing more natural light to enter and bringing better ventilation. A small public yard was distributed on ground floor, connecting the roads without breaking the original city circulations. This small yard created public space for residents as well as making the interior space opener, brighter and more sustainable. Window blinds were used to protect from too much sunshine and always controlled interior thermal comfort.



Figure 4.74: Sketch of residence Cambo. (Source: drawn by Luis Bravo)



Figure 4.75: Ground floor of residence Cambo. (Source: provided by Architect)



Figure 4.76 & 4.77: Residence Cambo. Architecture volumes were removed selectively to improve the interior physical environment conditions. Window blinds were used to protect the interior space from too much sunshine, always considering to provide a comfortable thermal condition. (Source: provided by Architect. Photographer: Montserrat Vigas)

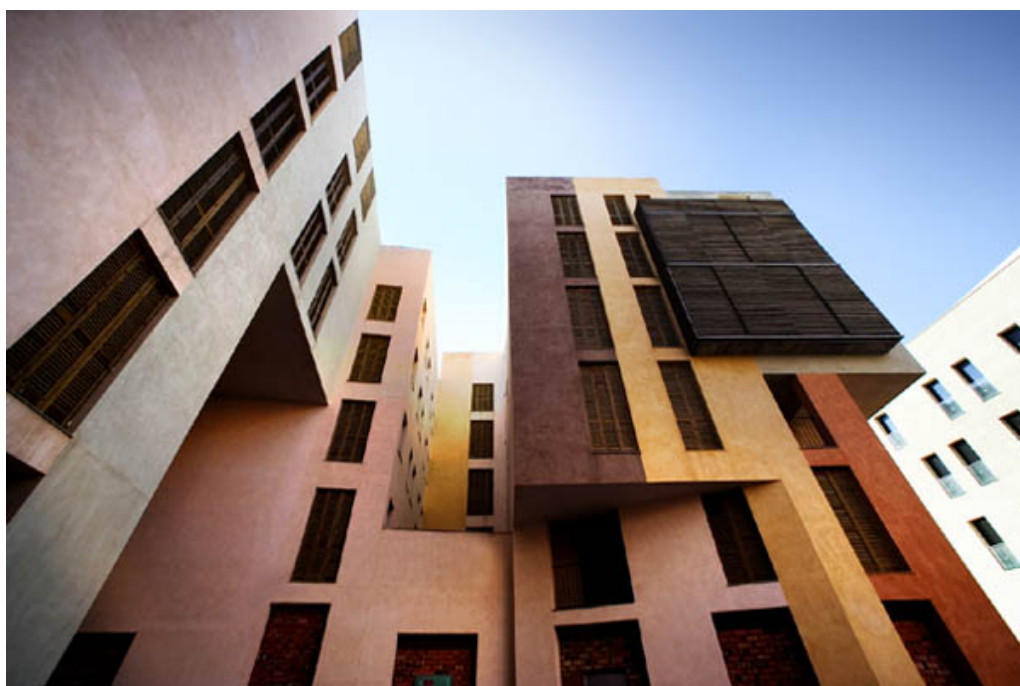


Figure 4.78 & 4.79: Residence Cambo. Details. (Source: provided by Architect. Photographer: Montserrat Vigas)

Apart from adjustments on architecture forms and distributions, other methods of protections like installations of thermal isolation and insulated glass window, are also effectively sustainable methods which could create comfortable interior physical environment. Now in contemporary elderly housing, these methods are always obligatory according to sustainable developing strategy in China.

Artificial illumination environment

Light affects much the space experience. Lighting environment includes natural lighting and artificial illuminations. As said before, natural light could bring positive impressions and using experience, making the elderly live with more comfort and pleasure. Architectural design on forms and distributions as doing in the former case of Residence Cambo could help to create a good natural light environment during the day, while artificial illumination is another important and necessary part which should be considered in the creation of good lighting environment. Natural light and artificial illumination together form the whole lighting experience of space.

Lighting environment is always associated with the health conditions and habits of the elderly. Artificial illumination design should respect to the healthcare and life style of the elderly to provide a better interior lighting environment.

Studies on elderly physical health conditions indicate that: *“As people age, they experience neurodegeneration in the retina and in the suprachiasmatic nucleus (SCN). Less light reaches the back of the eyes because the pupils decrease in size as you age, the lens inside your eye becomes thicker, and the lens scatters more light, causing objects and colors to appear less vivid.”*⁷⁴ *These symptoms are particularly common with persons having alzheimer's disease. Older people also have reduced levels of retinal illuminance, such as having smaller pupils and less transparent crystalline lenses. Furthermore, as an individual age, they begin to lose retinal neurons, which not only compromises the ability to see but also to register a robust daily pattern of light-dark that is needed to maintain biological*

⁷⁴ Light Research center. Lighting the Way: A Key to Independence.
<http://www.lrc.rpi.edu/programs/lightHealth/AARP/senior/helpingOlderAdults/agingEye.asp>

rhythms. The 24-hour light-dark cycle is the most important external stimulus for regulating the timing of the circadian cycle.”

“In addition to the aging eye, lighting designers need to consider the unique lifestyle needs of the elderly. It is especially important to provide strong illumination in stairwells to prevent slip and trips, for example. Due to physical limitations, they may be deprived of natural sunlight. Many nursing homes and assisted living facilities have dim, constant light levels and poor light spectra, often caused by extensive use of fluorescent lighting. Although widely used in offices and factories, it is unsuitable for clinics and homes. This can cause disruption of the body’s circadian rhythms, which can potentially lead to negative health effects. Flicker from the bulbs can be disturbing, especially for epilepsy patients, and the colour rendition is poor when compared with incandescent bulbs.” (Lighting for the elderly, wikipedia)

Firstly, compared with young people, due to the loss of eye abilities, the elderly need high lighting levels with special design on contrast, glare, color saturations and shadow, to make sure their daily life activities. Poor lighting conditions would lead to unsafe accidents as slips, trips and falls in the elderly by lowering visibility of hazards such as unexpected steps, or sudden changes in floor surfaces⁷⁵. Elderly housing always needs sufficient illuminance with particular design to provide a safe lighting environment.

⁷⁵ Lighting for the elderly. https://en.wikipedia.org/wiki/Lighting_for_the_elderly

Age-related visual impairments

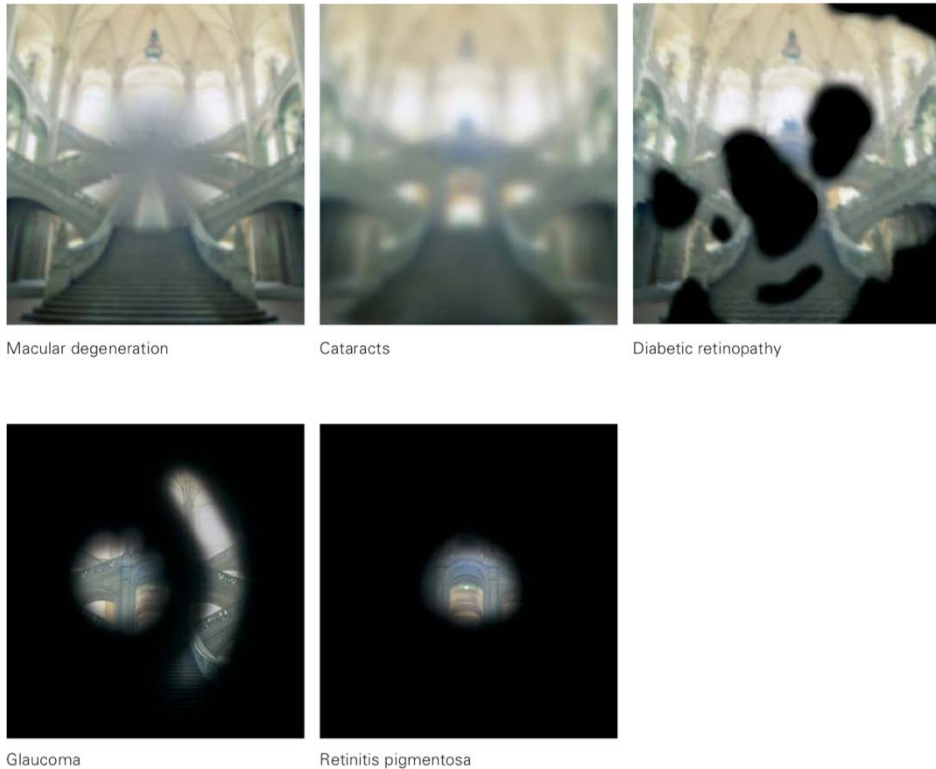


Figure 4.80: Sight in our senior years. (Source: Lighting for Senior Care: Good Lighting Enriching Life. DERUNGS LICHT AG, www.waldmann.com)

For this, lighting Research Center of Rensselaer Polytechnic Institute has made a series principles of lighting design for the elderly. The principles include five aspects: Increasing light levels, minimizing glare, increasing contrast, balance light levels and improving color perceptions.⁷⁶ These principles are made particularly for the special health conditions of the elderly, protecting them from dangerous cases caused by eye problems.

⁷⁶ Lighting the Way: A Key to Independence.
<http://www.lrc.rpi.edu/programs/lightHealth/AARP/senior/helpingOlderAdults/agingEye.asp>

Light-related causes of falls

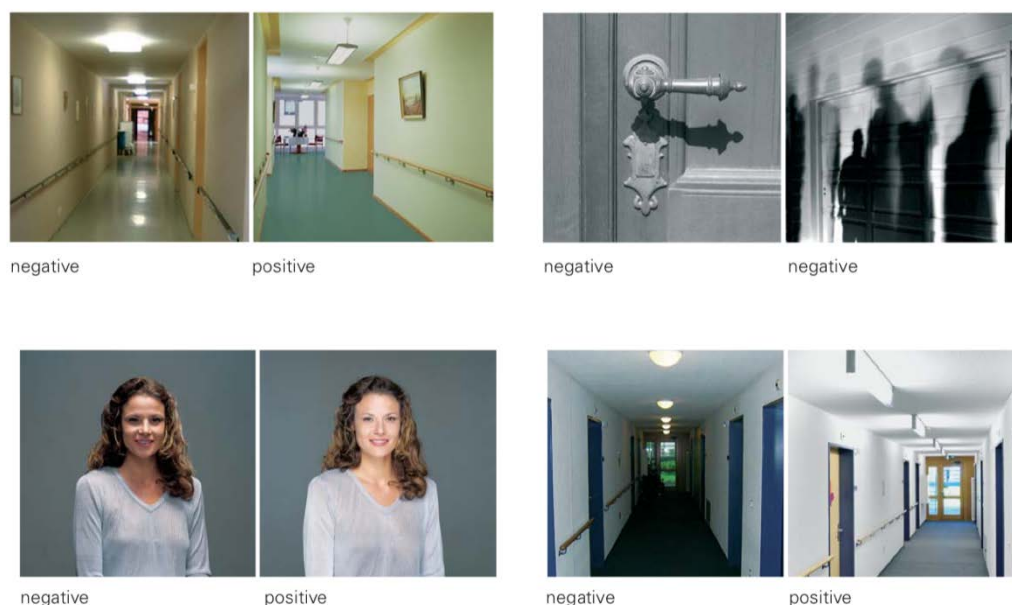


Figure 4.81: Comparisons of different lighting conditions. Poor lighting may cause dangers for the elderly. (Source: Lighting for Senior Care: Good Lighting Enriching Life. DERUNGS LICHT AG, www.waldmann.com)

Secondly, artificial illumination design should always respect to the life style and biological habits. Many seniors suffer from sleep problems that they couldn't fall asleep and wake up several times a night. These problems may lead to health problems and leave them without energy in daily activities. Lighting environment are related closely and affect much on the biological rhythms. Good design of Illuminations could reduce these problems and give the elderly healthy biological habits.

“Underlying the foundation of light as therapy is the understanding that all living organisms have biological rhythms that repeat approximately in 24-hour cycles, in accordance with the cycle of sunlight. The most prominent way to measure whether a body is entrained in this circadian cycle is by measuring melatonin secretion, cortisol, and core body temperature. The suprachiasmatic nucleus (SCN) regulates melatonin and temperature and typically produces melatonin at night. Melatonin informs the body when it is time to sleep. When circadian cycles become disrupted (due either to too little light or too much light at the wrong time

of day), melatonin is produced at disrupted times. This causes an individual to experience disrupted sleep patterns, which in turn causes numerous health issues to arise.

The key external stimulus is variation in light and darkness over the course of the day. The elderly are at high risk for physical ailments when their circadian cycles are disrupted. Impairment of these SCN-mediated circadian rhythms becomes increasingly common with advancing age, diminished health, and Alzheimer's disease, thereby contributing to the high prevalence of sleep disturbances in these populations.” (Lighting for the elderly, wikipedia)

Light illuminance level and color are main factors that affect the biological habits and body clock of the elderly. The daily light–dark pattern reaching the retina is the main input to synchronize the biological clock to the solar day. If humans are not exposed to a sufficient amount of light of the right spectrum, for a sufficient amount of time, and with the right timing, the biological clock becomes desynchronized with the solar day and humans may experience decrements in physiological functions, neurobehavioral performance and sleep.⁷⁷ High circadian stimulation during the day (circadian stimulus >0.3 or >400 lux at the eye of a bluish-white light) and low circadian stimulation during the evening (circadian stimulus <0.1 or <50 lux at the eye of a yellowish-white light), can help to deliver a robust light–dark pattern⁷⁸ and regular their body clock to solve healthy problems.

On this point, for the elderly light with high level and cold color could active them while low level with warm color is more helpful to create sleeping atmosphere. In elderly housing, space for daily activities as working space, dining room, public center can provide a high-level and cold lighting environment to make the elderly more active during day. While in the evening, light should be changed to low level and warm color in dormitory to make them easily to fall asleep.

⁷⁷ Leproult R, Holmbäck U, Van Cauter E, 2014. “Circadian misalignment augments markers of insulin resistance and inflammation, independently of sleep loss”. *Diabetes*. 2014 Jun; 63(6):1860-9.

⁷⁸ Mariana G Figueiro, 2017. “Light, sleep and circadian rhythms in older adults with Alzheimer's disease and related dementias”. *Neurodegener Dis Manag*. 2017 Apr; 7(2): 119–145. Published online 2017 May 24. doi: 10.2217/nmt-2016-0060. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5836917/#>

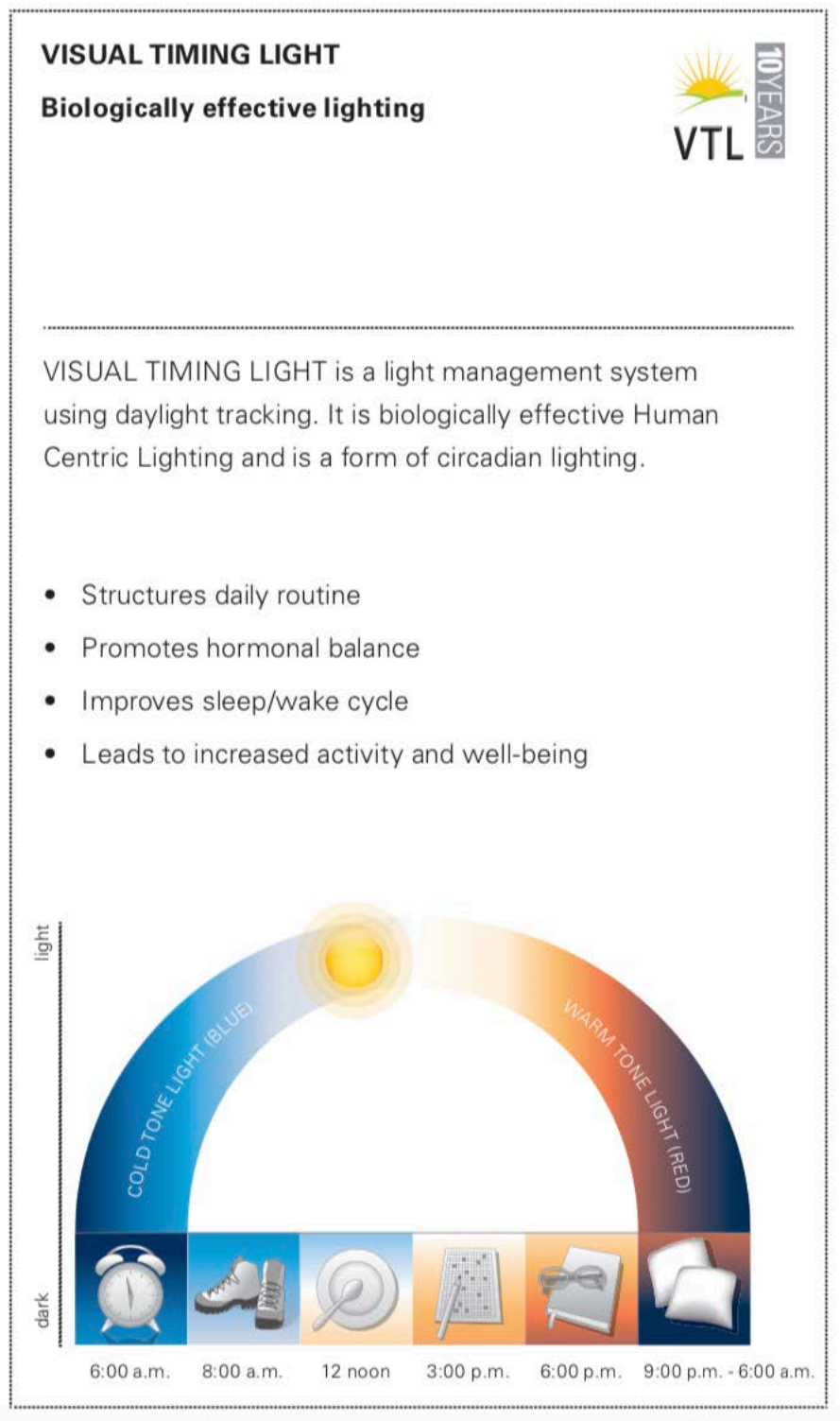


Figure 4.82: Visual Timing light is a study of light therapy based on influence of lighting on biological rhythm and body clock, creating a healthier biological lighting environment. (Source: “Lighting for Senior Care: Good Lighting Enriching Life”. *DERUNGS LICHT AG*.)



Figure 4.83 & 4.84: Circadian-friendly lighting strategies may be beneficial for residents of senior facilities, including people with Alzheimer's disease. The LRC's 24-hour lighting scheme demonstration room provides cycled electric lighting with cool, high light levels during the day and warm, low levels in the evening. (Source: courtesy of the Lighting Research Center.)

Besides physical health, illumination environment is also related to psychological health of the elderly, which further affects their using experience and feelings of the space. Space functions lead to different light requirements in mental level. The elderly could have different emotional requirement for light in different space. For example, in space as dining room and salon, high light level can make the elderly more active and pleasant while darkness would lead to anxiety and lonely. While in some intimate space as bathroom, too much illuminance would make people feel disturbed. Instead, low lighting level make the elderly feel calm down and comfortable.⁷⁹

Light colors also impact on elderly people's mood. In the ACE project⁸⁰, the research group tried to find the impacts on elderly people's mood of different colored lighting ambiances. They used different colored lights to create different ambience and made experiments with thirty-eight older people, with an equal number of males and females between 66 and 94 years.

Their study was based on series studies of lighting ambience and mood: *“Ali revealed that red light suppressed EEG alpha activity more than blue light, indicating that red light was more arousing than blue light. Wilson found that red light increased skin conductance compared to green light. Jacobs and Hustmeyer found that red light projected on a screen was more arousing than green light, and green light more arousing than yellow and blue light, as measured by an increased skin conductance. Gerard found that red light was more arousing than blue light, a conclusion that was deduced from an increased augmented systolic blood pressure, skin conductance, respiration rate, and cortical activation.(...) With respect to valence, it is often reported that short wavelength colors (such as blue, green) evoke more pleasant feelings than long wavelength colors (such as orange, red)(...)Not only the context but also the lightness and saturation of the color(ed lighting) was found to be very important for its influence on*

⁷⁹ Zhang Yufang, 2006. Studies of the Lighting Environment of the Interior for the Elderly. Tianjin University.

⁸⁰ACE project aims to study the relation between elderly's mood and lighting ambiances by Philips and TUD funded by PointOne of Agentschap NL.

Kuijsters A, Redi J, de Ruyter B, Heynderickx I, 2015. “Lighting to Make You Feel Better: Improving the Mood of Elderly People with Affective Ambiances”. *PLoS ONE* 10(7): e0132732. <https://doi.org/10.1371/journal.pone.0132732>

mood.”(Kuijsters A, Redi J, de Ruyter B, Heynderickx I ,2015) “Recent research revealed consistent effects of lighting characteristics on atmosphere perception. Warm white light (2800K) was perceived as cozier and less tense as compared to cold white light (6000K). Increasing the illuminance (from 40 to 400lx) resulted in a less tense, and more lively perception of the ambience. Spot light was considered livelier and less tense than more diffuse light. Finally, yellow and red colors at low saturation were found to contribute to coziness perception, while highly saturated red light was considered as tense.”⁸¹

According to this, they had created different ambience characteristics with lights of different colors and illuminance.



Figure 4.85 & 4.86: An impression of the activating ambience (left) and cozy ambience (right). (Source: Kuijsters A, Redi J, de Ruyter B, Heynderickx I (2015) Lighting to Make You Feel Better: Improving the Mood of Elderly People with Affective Ambiences. PLoS ONE 10(7): e0132732. <https://doi.org/10.1371/journal.pone.0132732>)

⁸¹ Andre Kuijsters, Judith Redi, Boris de Ruyter, and Ingrid Heynderickx. “Improving the mood of elderly with coloured lighting”. Delft University of Technology, Delft, The Netherlands. Philips Research, Eindhoven, The Netherlands

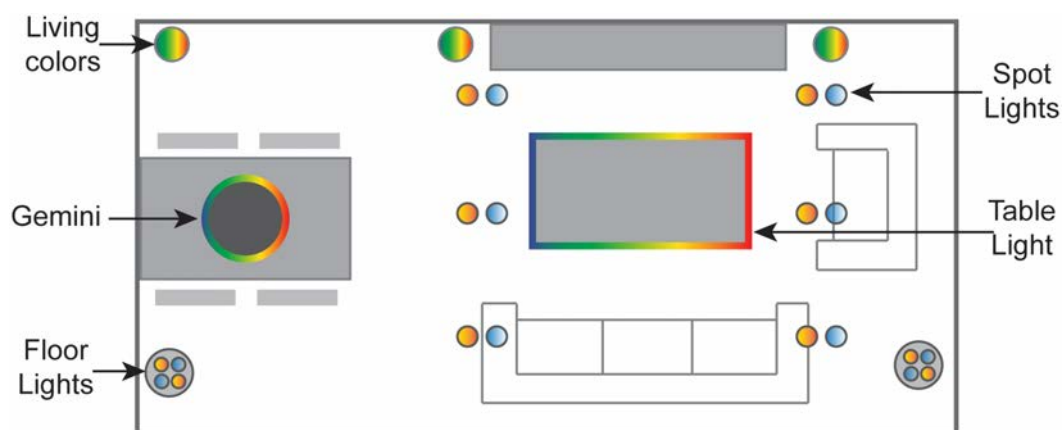


Figure 4.87: An overview of the installed luminaires in the experimental room. (Source: Kuijsters A, Redi J, de Ruyter B, Heynderickx I (2015) Lighting to Make You Feel Better: Improving the Mood of Elderly People with Affective Ambiances. PLoS ONE 10(7): e0132732.)

In the experiment, the research group monitored the evolution of the mood of the four groups of the elderly over a period of ten minutes after the mood induction, with both self-reported mood measurements (every 2 minutes) and constant measurements of the skin conductance response (SCR) and electrocardiography (ECG). In line with their hypothesis they found that the activating ambience was physiologically more arousing than the neutral ambience. The cozy ambience was more effective in calming anxious elderly than the neutral ambience, as reflected by both the self-reported and physiological measurements. (Kuijsters A, Redi J, de Ruyter B, Heynderickx I, 2015)

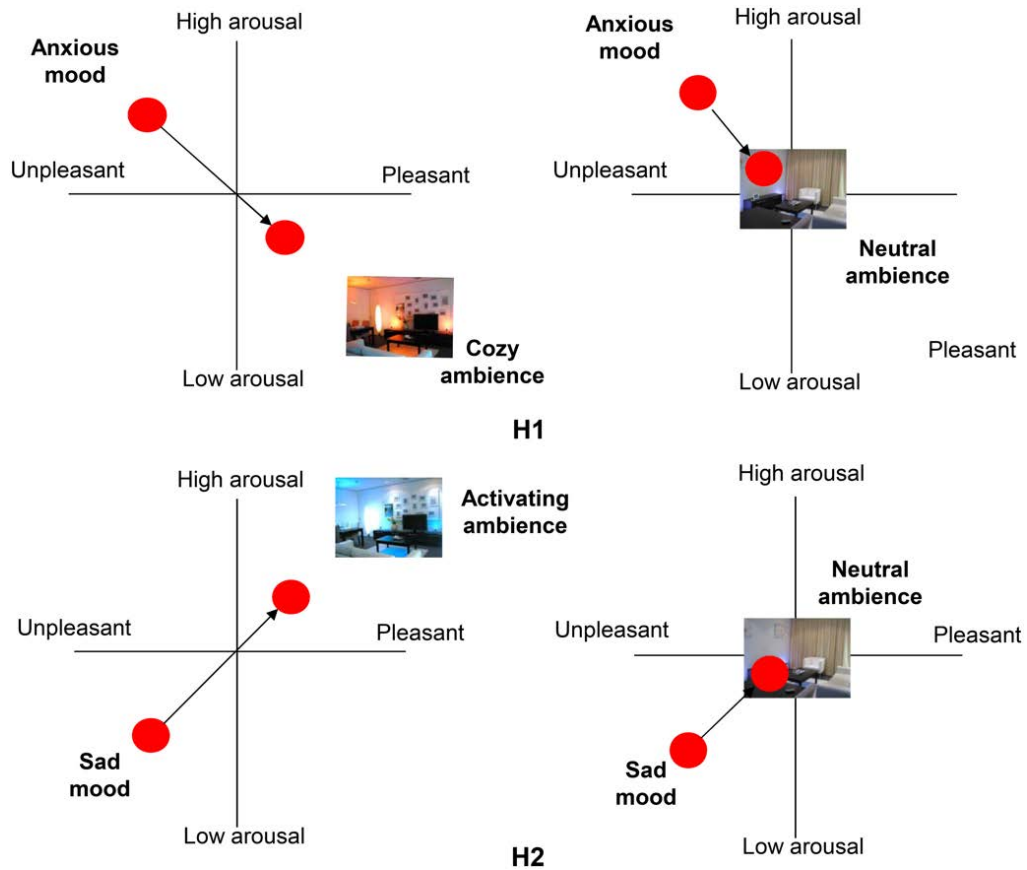


Figure 4.88: (H1) an activating ambience is more effective in increasing both pleasure and arousal in elderly that are in a sad mood than a neutral ambience, and (H2) a cozy ambience is more effective in both increasing pleasure and reducing arousal in elderly that are in an anxious mood than a neutral ambience. (Source: Andre Kuijsters, Judith Redi, Boris de Ruyter, and Ingrid Heynderickx. "Improving the mood of elderly with coloured lighting". Delft University of Technology, Delft, The Netherlands. Philips Research, Eindhoven, The Netherlands)

Sound environment and special healthcare

Sound, apart from esthetic meanings, it is also related to the using experience of space. Acoustic design of space affects much the comfort and quality of space, as well as impacting on the health of the elderly.

We are always hearing and sound environment can affect our feeling of space as well as health conditions unconsciously. In contemporary elderly housing, besides noise controlling of the environment, architect should pay more attention to the special meaning of healthcare of sound environment design, to provide a better and healthier living space for the elderly.

Sound, as light, could affect the elderly's health and mood. As said before, the elderly are always suffering from sleeping problems. Healthy sound environment can help to solve this problem, then further helping prevent memory loss of the elderly. In the recent research, it has shown that deep sleep plays a crucial role in memory formation. As humans age, sleep becomes lighter and more fragmentary, however, which in turn means that older adults get less deep sleep than younger ones. So, it isn't entirely surprising that deprivation has been linked to memory loss among the elderly.⁸² Sound that helps you fall asleep is not defined by whether it is 'quiet' or 'noisy'. It depends on the mental conditions necessary for the person to do so. A traveler can sleep very badly if he does not hear the sound of his house clock to which he is accustomed. In addition, there is no space without sound. We cannot find a completely quiet place. There is an investigation that tries to recreate the quietest space possible, leaving some people living there a few days to observe the relationship between sound and sleep. The result shows that the subjects of the experiment do not have a higher quality of sleep than before. This is because they lose their usual sound environments, affecting their sense of security.

⁸² Brigit Katz, 2017. "Pink Noise May Improve Sleep and Memory in Older Adults. A new study has found that sound stimulation at night can lull people into a deep sleep". *Smithsonian.com*. march 10, 2017 <https://www.smithsonianmag.com/smart-news/pink-noise-may-improve-sleep-and-memory-older-adults-180962466/>

Compositions of sound are also important. Not all sounds can be used to create a background for sleeping. According to previous researches, there are three types of sounds that bother us a lot when sleeping.

First, the loud sound, like the sound of a motorcycle or truck, or the sound of an alarm. Second, the sound with a very fast or very slow rhythm that is much higher or lower than the beat of the heart. It is not necessary to be very high, this rhythm can affect our heart and give us a nervous feeling. Third, the sound that carries some strong information. For example, the crying of children.

These are sounds that can attract our attention, leaving us in an insecure and tense environment, which can bother us if they appear when sleeping.

With investigations, sound environment can serve to control and adjust mental activities adapted to different life requirements. Sound design not only means to control and eliminate the bothering sounds with different techniques, but also to configure space with suitable and comfortable sound compositions, in order to improve space acoustic qualities. Artistic methods could be applied in the design process to create poetic sound environment, which helps to relax and improve the spiritual state of the elderly.

Soft sounds, without an information that attracts attention, could be effective to promote sleeping for the elderly. The volume cannot be of great magnitude, they must be acceptable in a way that does not affect people. The frequency also has to be of a certain range. The white noises of tele are of this type, since they comprise different frequencies coherent with the range of human hearing. In addition, the sound level of each frequency is also balanced and is relatively stable, fluctuating irregularly in a small area. Similar to “white noise”, a new study puts forward that “pink noise” with these characteristics could help solve sleeping problems for the elderly.

“As Amanda MacMillan reports in TIME, a new study suggests that “pink noise” can lull adults into deeper slumbers and help them form stronger memories. Pink noise is similar to white noise, but while white noise is one continuous sound, pink noise includes high and low frequencies. ‘It kind of resembles a rush of

water,’ Phyllis Zee, professor of neurology at Northwestern University and lead author of the study, tells MacMillan. ‘It’s just noticeable enough that the brain realizes it’s there, but not enough to disturb sleep.’ Zee and a team of researchers at the Northwestern gathered 13 adults who were 60 or older and monitored their sleep in a lab for two nights. On both nights, the participants took a memory test, went to bed while wearing headphones and an electrode cap, and took another memory test in the morning. But unbeknownst to the sleepy subjects, researchers only played pink noise into the headphones on one night.

More specifically, they timed the sounds to match the participants’ slow-wave oscillations. During deep sleep, brain waves slow to about one oscillation per second, compared to about ten oscillations per second during wakefulness, the researchers write in a press release. The algorithm they employed in the study allowed the team to deliver a low burst of pink noise at the “precise moment” that the participants’ slow waves rose—a pattern that is unique to each person.” (Brigit Katz, 2017)

Besides, natural sounds can also work to improve elderly people’s sleeping qualities. A study was made by scientists from the United States in 1992. They studied the effect of sea sound on the quality of sleep of patients after CABG operations. The experimental group transmits a mixed sound of the sea and white noise for 3 consecutive nights. Then they did some analysis on depth scores of sleep, wakefulness, re-sleep, quality of sleep and total sleep time, according to Richards-Campbell Sleep Questionnaire, RCSQ. The result showed that the patients accompanied with the sound of the sea had a better quality of sleep.⁸³

Another research from the Brighton and Sussex School of Medicine (BSMS) in the UK explains for the first time why the natural sound could work effectively to treat sleeping problems.

⁸³ Williamson JW, 1992. “The effects of ocean sounds on sleep after coronary artery bypass graft surgery.” *Am J Crit Care*. 1992 Jul;1(1):91-7.

On this study, the researchers found that natural sounds affect the body systems that control the “flight or fright and rest-digest autonomic nervous systems with associated effects on the resting activity of the brain.”⁸⁴

Whether you are sleeping at night or concentrating on work during the day, natural sound has the effect of eliminating distractions. The natural sound added to the space as a background can draw our attention and minimizes discomfort. During the day, when we focus on a job, this sound can help stay concentrating. At night, when we want to be relaxed, this sound again works by emptying our consciousness, helping us to fall asleep.

The lead author, Dr Cassandra Gould van Praag said: “We are all familiar with the feeling of relaxation and ‘switching-off’ which comes from a walk in the countryside, and now we have evidence from the brain and the body which helps us understand this effect. This has been an exciting collaboration between artists and scientists, and it has produced results which may have a real-world impact, particularly for people who are experiencing high levels of stress.” (Brighton and Sussex School of Medicine, 2017)

In contemporary elderly housing, artist, architecture and scientist could work together to create healthy sound environment to treat health problems of the elderly, and improve the space meaning and using experience.

Actually, there are many projects of artists working together with scientists to create an effective sound environment for mental health in different ways. The audiovisual artist Mark Ware and the scientific team of BSMS carried out an experiment in which the participants listened to sounds recorded in natural and artificial environments, while their brain activity was measured in a magnetic resonance imaging (MRI) scanner. Autonomic nervous system activity was analyzed in minute changes in heart rate.

⁸⁴ “IT’S TRUE – THE SOUND OF NATURE HELPS US RELAX.” Brighton and Sussex School of Medicine, 2017. <https://www.bsms.ac.uk/about/news/2017/03-31-the-sound-of-nature-helps-us-relax.aspx>

"The team found that the brain's default network activity (a collection of areas that are active when we're resting) was different depending on the sounds that played in the background. Thus, the connectivity of the brain reflects a focus of attention directed towards the outside when listening to natural sounds and inwards in the case of artificial sounds, something similar to anxiety states, post-traumatic stress disorder and depression. " (Brighton and Sussex School of Medicine, 2017)



Figure 4.89: Experimental project of Mark Ware, showing the influence of the natural environment for elderly people on sleeping problems. Visual image with sounds. (Source: "IT'S TRUE – THE SOUND OF NATURE HELPS US RELAX." Brighton and Sussex School of Medicine, 2017.)

3.3. Emotional reflection in elderly housing space

According to Norman's emotional design theory, emotional involvement on reflective level can bring a deep touch which provides full impact of both thoughts and emotions (Norman, 2007, p38). The former two levels of visceral and behavioral make affect directly, however it is without interpretation or consciousness. Reflective level is interacted with personal acknowledge,

cognition, culture, memories, tradition, perception and aesthetics, creating deep emotional influences.

Coming back to the nature and origins of living space for the elderly, it is a place where the elderly feel being protected, natural and free, as well as expressing their own identities. It is a space to demonstrate who they are. Because of this, space emotional creation on reflective level is a necessary method to satisfy elderly people's desire of identities as well as create presence and meaning of living space. In contemporary elderly housing refurbishing process, emotional expression on reflective level could be realized by combinations with culture, memories, traditional aesthetics and personal values.

3.3.1. Culture and memory reflection

Culture and memory are the most representative symbols which create the uniqueness of different regions. Culture and memory present the special thoughts, cognitions, experiences, tradition, history, and understandings of a region, showing the unique life style. Introduction of culture and memory to contemporary living space provides social identities which are adapted to the cognitions, tradition, habits and understandings of the elderly, creating mental familiarity and safe sense as well.

Zumthor is used to creating “architectonic dramatization” in his project to reach the memory: *“Maybe it’s the only possible way to remember, because it’s only through emotions that mankind can remember. Temporality is realized when the work considers the space in its totality, without distinctions between in and out. It is perceived only to (and in presence of) a spectator of the work that lives its volumes, contributing to strengthen the relations between architecture and the spectator himself. ‘To build a monument, – as Zumthor said – where every politician put up his plaque or his wreath, is the first act of forgetfulness’”*⁸⁵

⁸⁵ Nico Saieh, 2010. “Multiplicity and Memory: Talking About Architecture with Peter Zumthor.” *Archdaily*, 2010, November, 2. <https://www.archdaily.com/85656/multiplicity-and-memory-talking-about-architecture-with-peter-zumthor>

In his project of the Elderly Housing in Chur Switzerland, the memory and culture were introduced follow his manner. He created a space to experience the past and culture based on considerations of what elderly need and like.

“I work like this: you see something, and all the things on this world have their history, it’s inevitable. All has its history, even the bad things. All is recounting a long, long history for everyone, not only for architects. Therefore, it’s very normal to work with memory. But you have to be aware about these things and you have to know how to see them without losing yourself in an academic field.”
(Nico Saieh, 2010)

He always treated architecture space and the surrounding landscape as a whole. Space was rooted in the local landscaped. Local materials and architectural shapes performance as emotional connections interacted with elderly people’s perceptions and memories. With light and air, space became architectonic dramatization, making culture and memory have presence. He created a familiar atmosphere for elderly, in which elderly could always get emotional resonance of identities from architectural details.

“Many of the residents grew up in mountain villages around the area. They have always lived in the country and feel at home with the traditional building materials used here – tuff, larch, pine, maple, solid wood flooring and wooden paneling.”⁸⁶

“In architecture, there’s always an underlying need. I think of the utilization: is what I do valuable? Do I like it? And what does it lack? I try to think and feel together the needs of function, use, and the peculiarity of the place. In the place physical appearance, when it’s observed, there is the whole history, because history shows in the world’s body, much more than in books. Also in books, certainly, but history, the memory, becomes narrative to be studied in university, where they need the book’s narration. But the true history, our families’ history, our people’s history, is here, and here, and there, and once again here, isn’t it?

⁸⁶ Rose Etherington, 2009. “Key projects by Peter Zumthor.” *Dezzen*, 2009, April 18. <https://www.dezeen.com/2009/04/18/key-projects-by-peter-zumthor/>

So this is my work: to observe, and to understand what I see...or to try to understand.” (Nico Saieh, 2010)



Figure 4.90: Whole image of the area of Chur, Switzerland. Nature, stone, wood are cultural symbols and memories of local people.(Source: <https://chur.graubuenden.ch/en/explore-regions/chur/chur-old-town>)



Figure 4.91: Local materials were used in the elderly housing of Chur. (Source: Nico Saieh, 2010. “Multiplicity and Memory: Talking About Architecture with Peter Zumthor.” *Archidaily*, 2010, November, 2.)



Figure 4.92: Local materials, stone and wood, interacted with light and air, making the culture and memories to be presence. (Source: Nico Saieh, 2010. "Multiplicity and Memory: Talking About Architecture with Peter Zumthor." *Archidaily*, 2010, November, 2.)

Culture and memory represent the uniqueness of dwelling characteristics, showing special life value and meaning. Culture and memory could be introduced by symbolic elements as material, shape, color as well as by respecting to special cultural contexts and life styles. In Chinese elderly housing expert Yanmin Zhou's project, she showed the great respect to local culture and memory, which created reflective touch for local elderly. In her project of elderly residence in Tibet, she distributed a special space for chanting, respecting to the life habit and social culture of local elderly people. Tibet has its special culture of chanting related to their social belief of buddha. Local people kept and respected a lot to this cultural tradition. In the project process, she noticed that an ancient temple located close to the site. The elderly in around villages went here for chanting every day, which had already become a social need here. Zhou attached importance to this social culture in her architecture with special considerations on the chanting space and circulation. Elderly could keep this cultural habit in their own housing.



Figure 4.93: Cultural activity of Chanting in Tibet. It is a daily habit and could be seen every day in Tibet.
(Source: <http://dy.163.com/v2/article/detail/E3Q0NNED05445S1M.html>)



Figure 4.94: Elderly housing by Yanmin Zhou. Architecture form, color and decoration elements have kept the special characteristics of Tibet traditional style (Source: blog of Zhou, Yanmin. <http://blog.sina.com.cn/zhuzhai01>)



Figure 4.95: The chanting group of old people around the yard. (Source: blog of Zhou, Yanmin. <http://blog.sina.com.cn/zhuzhai01>)

3.3.2. Esthetic reflection

Esthetic reflection, different from the aesthetic attraction on visceral level, could bring a high-level affect associated with people's understanding and perception of art. In visceral level, esthetic impressions happen directly and immediately, making people feel like or not without deep thinking. It is an instinctive response. People have their feeling without special understanding and consciousness. However, esthetic reflection is associated with people's cognitions, acknowledges, culture, experience...etc. The reflective esthetic affect is generated by series interactions with people's thoughts, showing their acceptance of identities.

For different regions, they always have their special esthetic identities, which belong to and are affected by their culture. Esthetic reflection could be realized by introductions of social esthetic identities to create esthetic resonance. On the other hand, esthetic reflection is also related to the understanding of art. People's understandings and perceptions of different art genres could affect their esthetic reflections of space, further determining their judgements of space.

The project of elderly housing in Alcácer do Sal in Portugal has interpreted a kind of aesthetic which combine traditional Mediterranean style and contemporary minimalism art. It could bring an esthetic reflection to local people to create philosophy thoughts. The whole project was presented in a pure white form. Extending in the landscape, the space provided a clean and natural sense, which made people think of the traditional white house of Mediterranean countries. White house, open space, big windows connected to landscape have already become the identities of Mediterranean aesthetics. With this pure architecture form, people could easily connect it to Mediterranean identities and their own esthetic experience. On the other hand, architecture as well as interior space was designed with minimal decorations, trying to demonstrate the beauty of the pure space. Minimalism aesthetics provides a philosophy thought that architecture is value of its space, something empty. This emptiness makes architecture possible to be used by people, which creates its meaning. With this emptiness, architecture started to become something with presence, somewhere to be experienced, to be felt and to be imagined. As said Zumthor, "*At the center of architecture, there*

seems to be an empty space. You can't plan emptiness, but you can draw its boundaries, and so empty comes to life. So architecture is emptiness, and if the architect wants to produce beauty, he has to work on light and vibrations (sonorous, tactile...) that spread in this absence."⁸⁷ The same thought could be seen in ancient China in Taoism, which affected a lot traditional Chinese architecture and art. Minimalism just tries to present the nature of contemporary architecture to the world.

In the space, elderly can experience the art of Mediterranean life style as well as the pure art of minimalism, thinking about the philosophy thoughts of contemporary art and architecture in this area. It is not only a space to live but also a place to experience and to think. This esthetic reflection creates high-level emotional touches on people's mind, satisfying their highest spirit need of life.

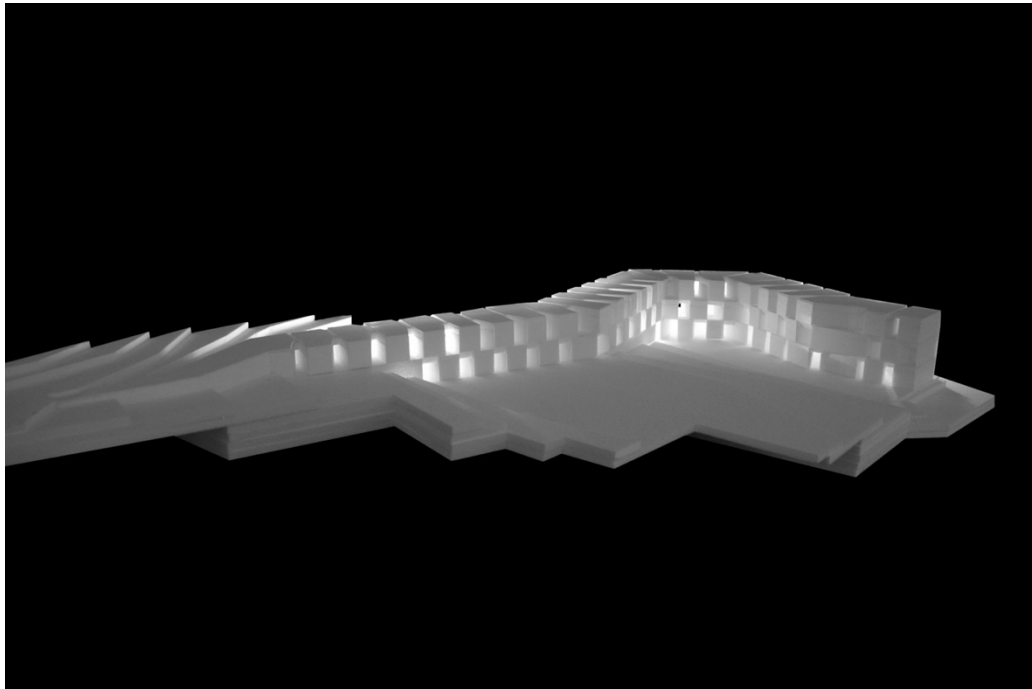


Figure 4.96: Architecture model of the project. (Source: Aires Mateus, 2010. "Houses for Elderly People in Alcácer do Sal", *Archidaily*.)

⁸⁷ Nico Saieh, 2010. "Multiplicity and Memory: Talking About Architecture with Peter Zumthor." *Archidaily*, 2010, November, 2. <https://www.archdaily.com/85656/multiplicity-and-memory-talking-about-architecture-with-peter-zumthor>



Figure 4.97: Pure architecture appearance showing a combination between traditional Mediterranean style and minimalism. (Source: Aires Mateus, 2010. "Houses for Eldery People in Alcácer do Sal", *Archidaily*.)



Figure 4.98: Pure architecture appearance showing a combination between traditional Mediterranean style and minimalism (Source: Aires Mateus, 2010. "Houses for Eldery People in Alcácer do Sal", *Archidaily*.)



Figure 4.99: Pure space with light provides an aesthetic thought for elderly (Source: Aires Mateus, 2010. "Houses for Elderly People in Alcácer do Sal", *Archidaily*.)



Figure 4.100: Interior space also presents minimalism aesthetics. (Source: Aires Mateus, 2010. "Houses for Elderly People in Alcácer do Sal", *Archidaily*.)



Figure 4.101: Interior space also presents minimalism aesthetics. (Source: Aires Mateus, 2010. "Houses for Eldery People in Alcácer do Sal", *Archidaily*.)

Another example in China has showed more clearly the combination between local esthetic identities and contemporary esthetic principles, working effectively to create emotional reflections both of local identities and art thoughts. In the project of Angdong Hospital refurbishing, architects reorganized traditional materials and characteristics with contemporary esthetic principles, trying to create a new art experience with local esthetic identity. This project is located in Xiangxi of Hunan province, where exists strong esthetic characteristics in all humanistic aspects as architecture, art, decorations, clothing...etc. In architecture field, the traditional aesthetics provide oriental images of staggered houses in hills with patios, bricks, grey tiles and slip roof. In this project, their task was to develop a model rural health care building capable of supporting the many progressive reforms on rural hospital management and care giving⁸⁸. Architects took local elements to keep the esthetic identities.

⁸⁸ Text description provided by the architects. <https://www.archdaily.com/553572/angdong-hospital-project-rural-urban-farm>

“The program of a hospital is re-configured from its conventional form. The design begins with a simple strategy to provide a continuous ramp access to all floors. A wide ramp allows for seating and improves circulation. This also creates a large central courtyard space open for public use. At the ground level, the courtyard provides additional steps for seating and serves as an outdoor waiting area. Materials consist of both recycled traditional bricks, which form the exterior façade, and custom designed concrete screen blocks, which flank the interior spiral passageway. Though from a distance they appear like the common type, these custom blocks are cast in a flexible latex mold. The resulting courtyard exhibits a soft and smoothly changing quality, casting variable shadows throughout the day.” Said the architects.

Architecture form and space decorations were simplified, with emphasizing the rhythm and geometries of architecture adapted to contemporary esthetic principles. Traditional slip roof was replaced by irregular lines and volumes, in order to demonstrate a more contemporary shape, but always corresponding to the staggered traditional housing layout.

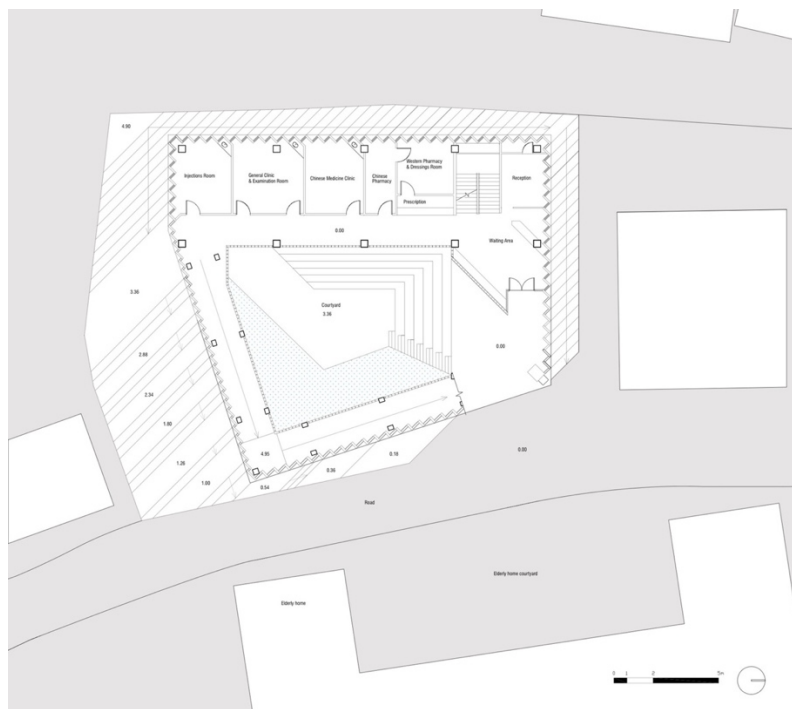


Figure 4.102: Plan of the project. Architecture used irregular lines and volumes to create a contemporary feeling as well as corresponding to the traditional staggered housing image. (Source: Joshua Bolchover and John Lin, 2011. “Angdong Hospital Project”, *Archidaily*.)



Figure 4.103: Architecture applied traditional aesthetic identity into contemporary aesthetic principles.
(Source: Archidaily. Joshua Bolchover and John Lin, 2011. "Angdong Hospital Project", *Archidaily*.)



Figure 4.104 & 4.105: Architecture applied traditional aesthetic identity into contemporary aesthetic principles. (Source: Joshua Bolchover and John Lin, 2011. "Angdong Hospital Project", *Archidaily*.)



Figure 4.106 & 4.107: Traditional elements were designed with contemporary aesthetic principles. (Source: Joshua Bolchover and John Lin, 2011. "Angdong Hospital Project", Archidaily.)



Figure 4.108: Architecture applied traditional aesthetic identity into contemporary aesthetic principles.
(Source: Joshua Bolchover and John Lin, 2011. "Angdong Hospital Project", *Archidaily*.)

3.3.3. Personal value reflection

Based on the former analysis, dwelling activities show the original desire of demonstrating the own identities of different communities. Living space should provide possibilities to satisfy this desire. Besides social identities of culture, memory and aesthetics, this desire of expressing the uniqueness of identities also refers to personal value. Especially for the elderly, as retiring from their work, they need to find their personal value through living activities. Living space should offer possibilities to reflect personal value, making them feel that they are still useful to the world rather than being abandoned. This reflection of personal value could prevent the negative mood of useless and helpless, making the elderly feel the hope of life.

Associated with this concept, the most popular idea to create personal value in current elderly housing is Home farm, which combines living space with farm. Elderly can live and work in the farm and sell the products to the market. In 2015, architecture firm Spark made a conceptual design model of Home farm for Asian cities, which is thought as *"the next generation of retirement housing"* – a community of homes and health facilities combined with a vertical urban farm⁸⁹. The elderly housing was designed as a whole community with all facilities equipped. In the facade and patios, they designed farmland with contemporary agriculture system. Elderly can be employed to work in the patio or in their own home to produce food which would be used for all residence of the community and also be sold to other place.

"Named Home Farm, the design aims to tackle the main issues affecting cities in Asia cities. The first is that the number of people above retirement age is rapidly increasing, and the second is that the majority of food is imported rather than home grown. Spark believes both of these problems can be solved by transforming retirement communities into self-sufficient farming businesses, producing fruit and vegetables that can be sold to fund healthcare and other amenities for residents. Residents would be offered part-time employment within the farm,

⁸⁹ Amy Frearson, 2015. "Spark designs model for Asian retirement communities that double as city farms". *Dezeen magazine*, 2015, 11, 17. <https://www.dezeen.com/2015/11/17/home-farm-spark-model-asian-retirement-housing-communities-city-farms/>

although this wouldn't be a condition of the tenancy. This would allow them to make some income of their own, and also help them to feel part of the community. "Home Farm brings together the normally siloed activities of commercial farming and aged-care living," explained Spark director Stephen Pimbley, who presented the concept during the World Architecture Festival in Singapore earlier this month." (Amy Frearson, 2015)

Similar concept could be seen in European elderly housing communities. The elderly could work in the farm and produce food for the whole communities. Besides, elderly housing also could provide work chance or activities as artistic creation, elderly universities, dancing group to make the elderly be touched in reflective level that they are still valuable to the world.



Figure 4.109: Birdview of the project Home Farm (Source: Amy Frearson, 2015. Spark designs model for Asian retirement communities that double as city farms. *Dezeen magazine*, 2015, 11, 17.)



Figure 4.110: Farmland of the concept Home Farm (Source: Amy Frearson, 2015. “Spark designs model for Asian retirement communities that double as city farms”. *Dezeen magazine*, 2015, 11,17)



Figure 4.111: Farmland in patios and facade (Source: Amy Frearson, 2015. “Spark designs model for Asian retirement communities that double as city farms”. *Dezeen magazine*, 2015, 11, 17.)



Figure 4.112: Farmland in patios and facade (Source: Amy Frearson, 2015. "Spark designs model for Asian retirement communities that double as city farms". *Dezeen magazine*, 2015, 11, 17.)

Chapter 5

Inheritance of Chinese Cultural Identity and Special Emotional Needs of Chinese elderly

1. Chinese culture identities and Chinese elderly emotional needs

1.1. Essence of Chinese culture

China has a long history with rich cultural contexts. The oriental culture systems, including Japanese culture, Korean culture, are all based on the traditional Chinese culture. Culture, as a totality of social behavior and norms in human societies, is considered a central concept in anthropology, encompassing the range of phenomena that are transmitted through social learning in human societies. Culture reflects social perceptions and desires. Architecture, as a social product, is always affected by as well as express the culture. With the cultural influence, China has formed its particular architectural images which shows great difference from Europe. Space, as well as other kinds of art, is a way to express people's understanding and hopes for life, nature, society and politics, realizing a transmission of the original emotions.

Philosophy thoughts always form the base of culture, affecting all humanistic aspects. In China culture system, Confucianism and Taoism have played

important roles, founding the base of the traditional Chinese culture as well as social ideology. Taoism is one of the first philosophies in Chinese history. It is a religious and philosophical exploration on Chinese origin which emphasizes living in harmony with the “Tao”, intending to revealing the principle of everything that exists about its source, pattern and substance.⁹⁰ Taoism introduced a concept of living attitudes. It in general tended to emphasize wu wei (effortless action), naturalness, simplicity, spontaneity, and the three treasures: “compassion”, “frugality”, and “humility”.⁹¹



Figure 5.1: Chinese painting of Laozi. (Source: Painted by Zhang Lu)

⁹⁰ Pollard; Rosenberg; Tignor, Elizabeth; Clifford; Robert (2011). *Worlds Together Worlds Apart*. New York, New York: Norton. p. 164. ISBN 9780393918472.

⁹¹<https://en.m.wikipedia.org/wiki/Taoism>

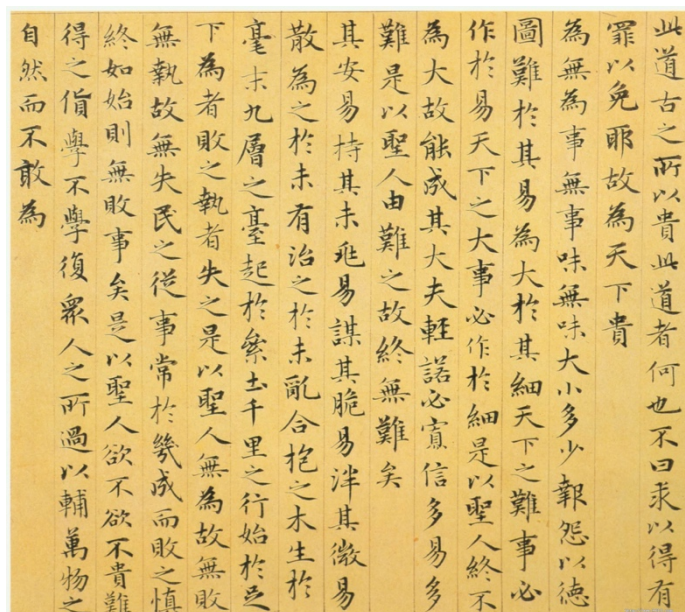


Figure 5.2: Calligraphy of “Tao Te Jing” by Zhao Mengfu (1254-1322 , Yuan dynasty. (Source: Collected at Gugong Palace museum.)

The roots of Taoism went back at least to the 4th century BCE. Early Taoism drew its cosmological notions from the School of Yinyang (Naturalists), and was deeply influenced by one of the oldest texts of Chinese culture, the I Ching, which expounded a philosophical system about how to keep human behavior in accordance with the alternating cycles of nature. The "Legalist" Shen Buhai (c. 400 – c. 337 BC) may also have been a major influence, expounding a realpolitik of wu wei. The Tao Te Ching, a compact book containing teachings attributed to Laozi is widely considered the keystone work of the Taoist tradition, together with the later writings of Zhuangzi.⁹²

Taoism had affected a lot on people's living attitude and their perceptions of the world. It reminded people to think about the nature of things rather than the appearance of things. It was the first in Chinese culture intending to tell the essence of life and the world and to make people understand the relationship among human, society and nature. It tried to introduce a guiding ideology and basic principles on people's living behaviors, which mainly concentrated on three aspects: respecting to the nature; respecting to life; living in harmony.

⁹² <https://en.m.wikipedia.org/wiki/Taoism>

Firstly, respecting to the nature is the most important and basic concept of Taoism. In the book “Tao Te Ching”, chapter 25, it has said: *“Human follows land, land follows sky, sky follows Taoism, Taoism follows nature.”*

Laozi, the representative and fundamental philosopher of Taoism, thought that “Tao” had generate the world and was the fundamental principle of the world. Everything of the world should live and behave following the principles of “Tao”. Than there is a question: what is “Tao”? “Tao” means essences and the truths of the universe and the world. Everything of the universe and the world had been created and grown up following the essences and truths. They are the bases of the world. People couldn’t live ignoring the essence of the world. For Laozi, the essence of “Tao” is the nature, that is, the nature generates the whole world and it is just the foundation of the human society. For this, respecting to nature is a basic requirement of human’s life. People’s activities shouldn’t be contrary to the nature. It is the essential principles of the universe and the world.

This concept had affected a lot traditional Chinese architecture on site selection, architecture form, material and landscape design. Taoism had put forward architecture evolution standards according to its concepts, which is well known as “Fengshui” today. Taoism thought architecture as a connection between people and nature. Architecture should not create a closed space separate from nature, but a place where people could always communicate better with the nature. And it should be designed with well considerations on all environment characteristics like water, mountain, air, wind, light, sunshine...etc.

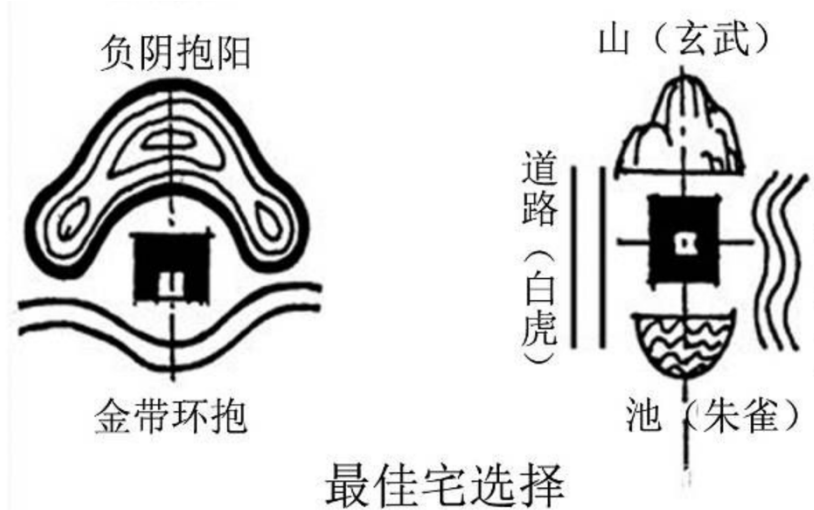


Figure 5.3: Sites with good “Fengshui” according to Taoism. (Source: Zhang Xiaorui, 2012. “Study on the construction of human living environment under the ecological thought of Taoism”, Doctoral Thesis, Xi’an Architecture and Technology University.)

Taoism thought that architecture should be constructed with mountains to the north and river to the south, which generated good Fengshui conditions. Almost all the important Chinese palaces were constructed according to this principle.

Patio is an important and necessary element of traditional architecture according to Taoism. Under the influence of Taoism’s concept, Chinese architecture had gradually generated the particular distribution with a patio inside, which made the whole architecture space connect to nature and have better ventilation and light conditions, no matter it was to the south or north of China. Although the forms of patio showed difference in different areas of China, it always existed as a centre and essential element of Chinese traditional architecture.

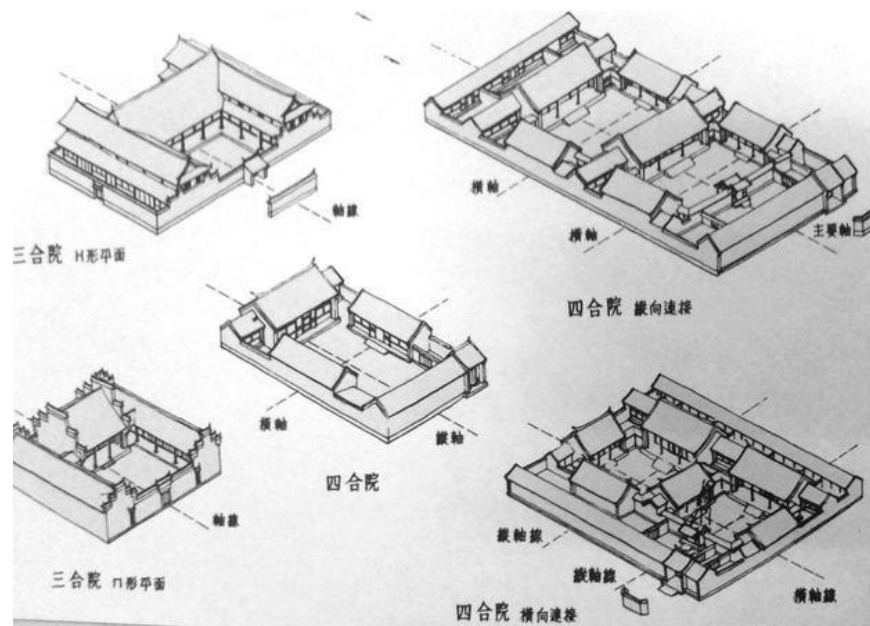


Figure 5.4: Different traditional architecture distributions with patios. (Source: Liu, Dunzhen, 1984. *History of Chinese ancient architecture*. China Architecture & Building Press. ISBN 9787112019298)

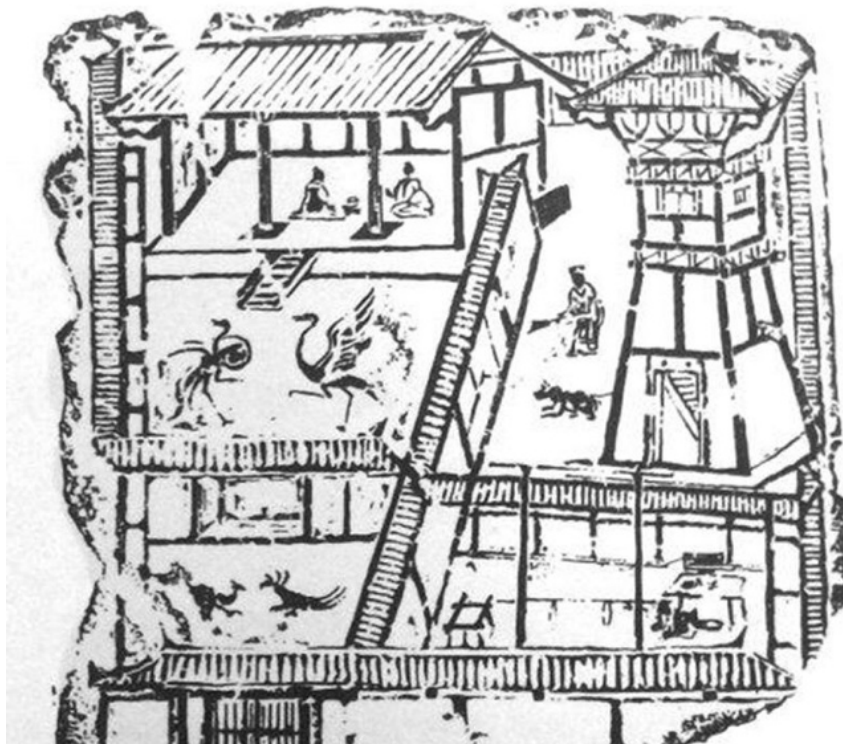


Figure 5.5: Painting recorded people's life activities in traditional architecture with patios. (Source: Liu, Dunzhen, 1984. *History of Chinese ancient architecture*. China Architecture & Building Press. ISBN 9787112019298)

Secondly, Taoism emphasized the respect to life. Life is related to nature directly. In Taoism, nature is the base of the world while life is the core. “Tao” or the nature is shown its presence through the interactions with life especially with human being. Respecting to life means we should live with concern about the needs of life. For human beings, personal needs should be thought about as well as social needs. Social needs always reflect the common desires of a community, which could show and be affected by the culture of community.

Thirdly, living in harmony is the most important attitude for life in Taoism. In “Tao Te Ching” chapter 42, it has described this concept as follow:

*“The Tao produced One; One produced Two; Two produced Three; Three produced All things. All things leave behind them the Obscurity (out of which they have come), and go forward to embrace the Brightness (into which they have emerged), while they are harmonized by the Breath of Vacancy.”*⁹³

Taoism thought that the world had characteristics of inclusive and integrate. There always exists a balance among the different compositions of the world. Everything has its opposition however they exist as a unit. The world grows up under the balance and the interactions between things and their oppositions. This harmony is a necessity of the development of the world. If the harmony was broken down, the world would be into chaos, both the nature and society. Following this concept, Taoism taught traditional Chinese to treat things with a harmonious and tolerant attitude, which deeply affected Chinese culture and people’s character till now. We can find there was always a harmony in the traditional Chinese architecture with the nature. On the other hand, it also taught traditional Chinese people to observe and think about things with a more integrate attitude, that is, to attach importance on every part of a thing as well as its opposite. They always go and work together. We should treat them as a whole to find out the harmony of everything.

⁹³ Laozi. *Tao Te Ching*, chapter 42, translated by James Legge.

James Legge (1815 – 1897) was a Scottish sinologist, missionary, and scholar, best known as an early and prolific translator of Classical Chinese texts into English. His respect for Confucianism was controversial among his fellow missionaries.

On this point, Taoism had talked about the architecture as an example in the Tao Te Ching:

“The thirty spokes unite in the one nave; but it is on the empty space (for the axle) , that the use of the wheel depends. Clay is fashioned into vessels; but it is on their empty hollowness, that their use depends. The door and windows are cut out (from the walls) to form an apartment; but it is on the empty space (within) , that its use depends. Therefore what has a (positive) existence serves for profitable adaptation and what has not that for (actual) usefulness.”

——— *Tao Te Ching, chapter 11.*

Architecture appears as a volume tangible. Architecture always gives people the first impressions through its appearance. But what is useful is the space, something empty and intangible of architecture. Architecture is meaningful because of its space. The space is what interacts with people directly. People’s activities in the space give architecture its function and make it valuable. Tangible things like materials and forms are all serving for intangible. They are things on the contrary however should be treated as a whole and both affect the architecture experience. This concept had given great influence and inspiration for traditional architecture design, which made ancient architects care about architecture appearance as well as space experience. Architecture form and material should work together to create a better space experience. They are always interacted with and complete each other. Interactions between tangible elements and intangible space interpret a harmony in architecture.

The same thought could be found in traditional Chinese arts. Traditional Chinese artists thought there should exist a harmony in painting composition. In traditional Chinese painting, artists never filled up the paper. They always left some parts empty which was called “leave white”. Besides to present more harmonious visual composition and better esthetic effect, they thought this white part could leave the whole work with more poetic sense and imaginations. As in architecture, people filled up the empty space with functions, the white part of painting was filled by people’s imagination. For those artists, the objects painted on the picture told a concrete story while the white parts help to complete the story with more

possibilities. It could help to evoke people's interest and make people think and experience more of the painting. Instead, if the painting was filled up, it would show a clearly story to people but leave less space for people to image and to think.

Taoism has inspired arts as well as architecture to care about the harmony between things tangible and intangible, to pay more attention on their interactions. This concept also has deeply affected contemporary occidental arts and architecture, like the great master of contemporary sound artist John Cage, Mies Van de Rohe and other minimalism artists...etc.



Figure 5.6: Shuihuachi Lake. Painted by Wen, Zhengming. Wen, Zhenming is one of the most famous artist of Ming dynasty. This painting well interpreted the philosophy thoughts of “Leave white”. The empty part represented the lake, leaving people with more imaginations. (Source: Suzhou garden museum, 2014. *Thirty-one scenes of Zhuozheng Park*. Zhonghua Book Press, 2014.)

Confucianism, also known as Ruism, is described as tradition, a philosophy, a religion, a humanistic or rationalistic religion, a way of governing, or simply a way of life.⁹⁴ Confucianism developed from what was later called the Hundred Schools of Thought from the teachings of the Chinese philosopher Confucius, who considered himself a recodifier and retransmitter of the theology and values inherited from the Shang and Zhou dynasty. In the Han dynasty, Confucian approaches edged out the "proto-Taoist" Huang-Lao as the official ideology, while the emperors mixed both with the realist techniques of Legalism.⁹⁵

Confucianism or Ruism was the basic social philosophy in the ancient China, which was also be treated as a representative thought of Chinese culture. From Tang Dynasty, Confucianism developed in response to Buddhism and Taoism and was reformulated as Neo-Confucianism. The influence of Confucianism had been seen in every part of traditional Chinese society. The core of Confucianism is humanistic.⁹⁶ It had systematically regulated people's social and political behavior and created social moral standards. Confucianism had put forward five moral standards as the basic and principle characters of Chinese people.

“The worldly concern of Confucianism rests upon the belief that human beings are fundamentally good, and teachable, improvable, and perfectible through personal and communal endeavor, especially self-cultivation and self-creation. Confucian thought focuses on the cultivation of virtue in a morally organized world. Some of the basic Confucian ethical concepts and practices include rén, yì, and lǐ, and zhì. Rén (仁, "benevolence" or "humaneness") is the essence of the human being which manifests as compassion. It is the virtue-form of Heaven. Yì (義/义) is the upholding of righteousness and the moral disposition to do good. Lǐ (禮/礼) is a system of ritual norms and propriety that determines how a person should properly act in everyday life in harmony with the law of Heaven. Zhì (智) is the ability to see what is right and fair, or the converse, in the behaviors exhibited by others. Confucianism holds one in contempt, either passively or

⁹⁴ Yao, Xinzong, 2000. *An Introduction to Confucianism*. Cambridge University Press. ISBN 0521643120.

⁹⁵ <https://en.m.wikipedia.org/wiki/Confucius>

⁹⁶ Adler, Joseph A, 2014, “Confucianism as a Religious Tradition: Linguistic and Methodological Problems”, *Gambier, Ohio, USA: Kenyon College*

actively, for failure to uphold the cardinal moral values of rén and yì.” ———
Wikipedia of Confucianism

Confucianism had been the principle and obligatory subject for ancient Chinese schools. All traditional Chinese students should learn and follow the standards of Confucianism, especially for those politicians.

As a main culture of ancient Chinese society, there is no doubt that Confucianism had showed great influence on Chinese traditional architecture and art. If we say that Taoism gave the first inspiration to the traditional Chinese architecture concepts, Confucianism had determined the guiding ideologies and created a complete norm system for architecture design. Compared with Taoism, Confucianism attached importance on social ritual norms and propriety, emphasizing family values and social classes. Architecture had to be distinguished according to social classes from its scale, form and decorations. Since the social ritual norms, Chinese traditional architecture was never treated any more as a simple space to live, but a symbol of social identity and a way to show their rights and thoughts. Architecture had to give emotional hints and present social identity and thoughts. All architectural elements like form, material and decorations all serviced for creating corresponding emotional reflections.

Due to the influence of Taoism, similar architectural ideas were inherited and developed in Confucianism, which mainly concentrated on the respect to nature and the harmony thought.

Like Taoism, Confucianism emphasized the respect to nature. It continued the Taoism concept of harmony between nature and human, and developed from three aspects: respect to nature conditions, take advantage of landscape and esthetic creations of natural elements.

For this reason, the traditional house model with patios inside were kept. Besides, with particular emphasis on the importance of the family and social harmony, rather than on an otherworldly source of spiritual values,⁹⁷ Confucianism had

⁹⁷ Fingarette, Herbert, 1972. *Confucius: The Secular as Sacred*. New York: Harper.

created a central value of Chinese culture. Even today, contemporary Chinese people still treat family and social harmony as the most important and essential things of Chinese culture. With these concepts, Confucianism finally forced Chinese society form classical and mature architecture models. Although architecture shapes varied in different areas, these essences of Confucianism were always kept. It can be shown clearly by comparing the representative house model of Beijing, to the north of China, and Minnan, to the south of China.

As said before, Siheyuan, is known as a typical house model in the north of China. Now in the city center of Beijing, the most of ancient houses are kept this model. This basic house model centers on a big rectangular patio with architecture constructed around the patio. All families lived together in the same house, which showed the great importance of family values in Chinese culture. In fact, it was the main idea that Confucianism wanted to pass to the Chinese society. While the increasing of family members, the house could be expended by connecting several basic house models. For big families, their houses always had three or more patios connecting different architecture units. The distributions of different family generations strictly followed the ritual norms of Confucianism.

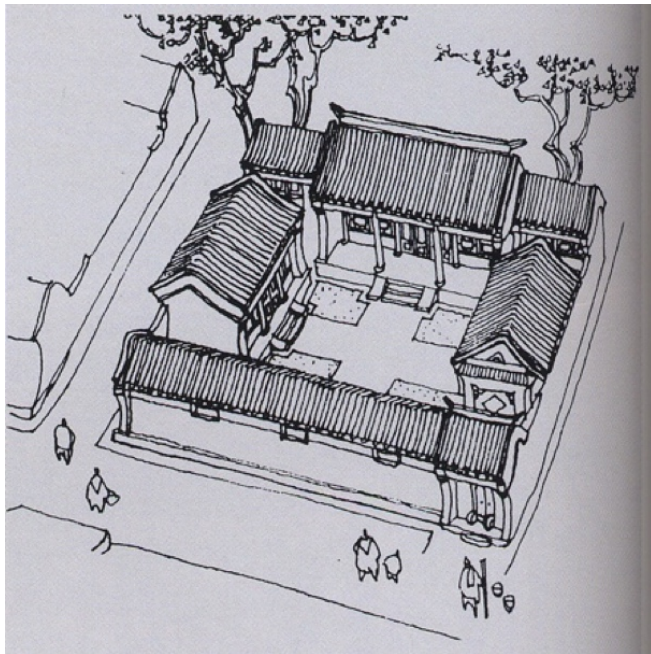


Figure 5.7: Basic architectural mode of Siheyuan (Source: Liu, Dunzhen, 1984. *History of Chinese ancient architecture*. China Architecture & Building Press. ISBN 9787112019298)

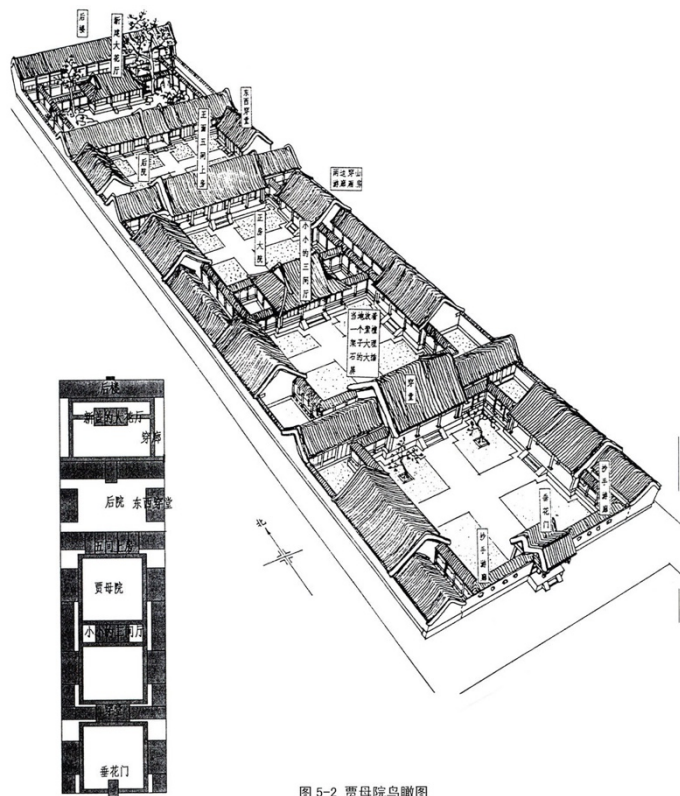


图 5-2 贾母院鸟瞰图

Figure 5.8: House of Jiamu with five patios. Beijing. (Source: Liu, Dunzhen, 1984. *History of Chinese ancient architecture*. China Architecture & Building Press. ISBN 9787112019298)

Similar architectural model could be seen in Minnan, the south of China. The following images shows a typical distribution of Minnan. The patio is still a necessary element. In this case, it has two patios. The one connected to the entrance is wider which provided a natural space for family activities. When enters the main house, there is a small patio inside. Different from north China, in south, the patio inside is always smaller due to the hot weather. The small patio can provide an environment with better ventilation while protecting from entering too much sunshine.



Figure 5.9: Traditional house of Minnan. Fujian province. (Source: drawn by the autor)

Because of the concept of staying in harmony between nature and architecture, Chinese traditional architecture never ignored the connection and communication between interior and exterior space. Chinese traditional architects always tried to find ways to blur the boundaries of indoor and outdoor space. As a result, roofs of Chinese traditional architecture always extended outward to generate a transitional space between indoor and outdoor space. This transitional space could be used as corridors and were only limited by roof and columns. It could be treated as an extension of both interior or exterior space, which had broken clear boundaries of architecture. This transitional space has not only created a connection between interior and exterior space, but also made a emotional integration of architecture space and nature. In addition, heavy stone walls were difficult to see in Chinese traditional architecture. Instead, light wooden walls, which could be opened completed, have further reduced the clear boundaries between architectural interior space and nature. When people stay inside, they won't feel being completely separated from nature. There is always existing a harmony between architecture and nature. Today, in contemporary architecture, transitional space is reintroduced by Japanese architect Kisho Kurokaya, which was called as "grey space" in his words. He had introduced that transitional space should be an open place where architecture and nature interpenetrate. Architecture and nature are symbiotic.

1.2. Chinese traditional architecture images based on Chinese traditional culture

As a result of society, the development of Chinese traditional architecture is always associated with culture, satisfying the humanistic requirements. For Chinese people, architecture was not only a place to live but also an interpretation of culture, reflecting their understandings and hopes for life, nature and society. Architecture was given more symbolic and spiritual presence connected to social culture and value system. Chinese architecture has formed its particular images, which was affected by as well as interpreted Chinese culture. The most representative architectural images are the Chinese traditional garden in Suzhou and forbidden city in Beijing, which were peak works and reflected Chinese culture essentials from different aspects.



Figure 5.10: The forbidden city of Beijing (Source: Liu, Dunzhen, 1984. *History of Chinese ancient architecture*. China Architecture & Building Press. ISBN 9787112019298)

Strongly affected by the concept of ritual norms and propriety of Confucianism, Chinese traditional architecture had formed a complete norm system which differentiated strictly all social classes. As said before, Chinese traditional architecture had been given its politic meaning and been treated as a symbol of social identities. For different social classes, architecture design should comply with the standards from its form to the decoration details. The forbidden city, as a symbol of imperial power, has completely interpreted the hierarchy idea of Chinese Confucianism.

Firstly, from the general plan, the forbidden city is situated in the centre of Beijing city, respecting to the ideal city model of Confucianism. It consists of many palaces. All palaces were constructed symmetrically along the central axis. According to Confucianism, the central axis was the most important place of the whole city. As a result, the three most important palaces: Taihe, Zhonghe and Baohe are situated on the central axis. They were national celebration and conference halls as well as working places for emperors. Other palaces, like living places for wives of emperor and service places were situated symmetrically on the two sides of the central axis, behind these three most important palaces.

The forbidden city also showed emperor's power from its big scale. The main palaces were situated behind several gates. A square always existed between two gates. When entered, people should first pass through these squares and gates before arriving at Taihe palace. The main gate Wumen gave a strong emotional pressure with its big scale and heavy volume, as well as the square in front. Besides the big scales, these squares were all designed in geometric shapes to create a stately atmosphere. Along with going forward, this emotional pressure would become stronger till the spectacular palace Taihe appearing. This design has created an increasing process of emotional experience. By step, people could strengthen their feelings of the solemnity of emperor's power, which successfully affected people's mind and made them to obey the social ritual norms from their heart.

Corresponding, architecture forms also complied with strict requirements. There were limits on architecture forms according to social class status. Only buildings

for emperors could use double slop roofs. In forbidden city, different palaces were designed in different forms depending on who lived in. The same requirements could be found in decoration design. In ancient China, golden color symbolized honor and could be only used by emperors.

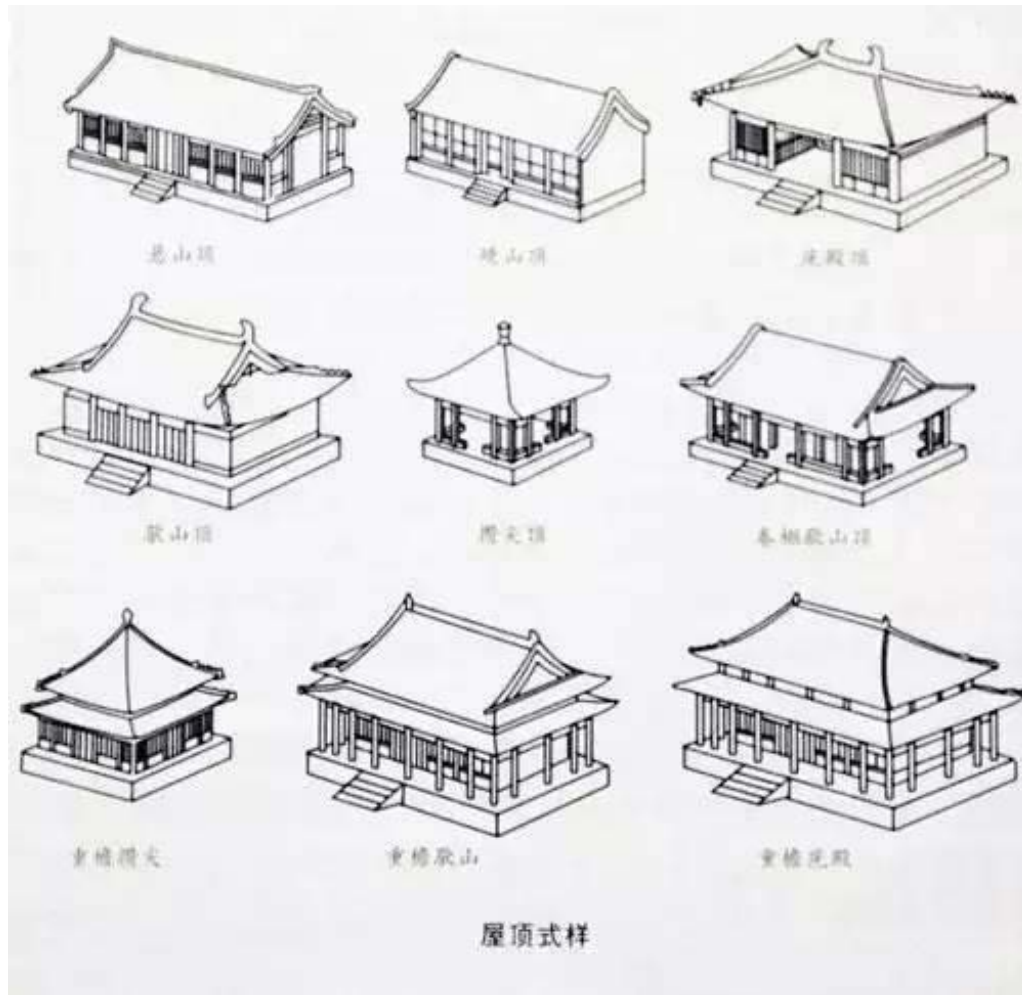


Figure 5.11: Different roof types. (Source: Liu, Dunzhen, 1984. *History of Chinese ancient architecture*. China Architecture & Building Press. ISBN 9787112019298)

The forbidden city is a representative example of Chinese traditional royal architecture. It has completely showed the characteristics of ancient Chinese society and the main thoughts of Confucianism. It has successfully combined culture essentials with architecture design, creating emotional reflections of the core social values at that time. Although today China has experienced a big transformation and architecture system has changed a lot, contemporary Chinese society has still kept some characters of Confucian culture: Chinese society always attaches much importance on the family value and social ritual norms till today. Architecture, as a product and reflection of society, should always inherited these cultural identities, in order to meet the humanistic requirements.

Chinese traditional garden

The forbidden city has created an architectural image to show the social value and ritual norms system of traditional Chinese culture, while the traditional garden has demonstrated the cultural thoughts of architecture, art and nature. Among Chinese traditional gardens, those in Suzhou have been treated as the best and most representative works. They made Chinese traditional garden design level reach its peak. And they gave a heyday of the development of Chinese traditional architecture. Suzhou gardens have showed the interactions among architecture, nature and arts, which always intended to involve some emotional reflections of life, society and the world. The design concepts as well as the methods have deeply affected contemporary architecture and arts in both oriental and occidental countries.

Different from the forbidden city, Suzhou gardens were houses of literati, poets, artists or businessman, who also were architects of their own houses. This group of people always had good education, talents and wealth, which was able to demonstrate the statue and essence of traditional Chinese aesthetics and arts. On this point, they also had played roles as representatives of Chinese traditional culture.

Suzhou gardens, as houses of normal people, were not necessary to carry on so much political meanings. Although social regulations of architecture should be always complied according to Confucian social ritual norm system, Suzhou

gardens could be designed in a more free way with creative artistic imaginations. The garden holders always had strong expectation for life. Architecture combined with art, was a expression of their thoughts, beliefs and hopes for life, nature and society. Compared with the Forbidden city, Chinese traditional gardens have presented another kind of architecture image mainly associated with the aesthetic and artistic aspects of Chinese culture.

Deeply affected by Taoism and Confucianism, garden design always kept strong respects to nature, intending to create good relationships between architecture and nature. Nature was thought as the main part while architecture was a part of nature. Architecture always designed with good adaption to the environment. Compared with the forbidden city, architecture forms of traditional garden are friendlier to nature. The forbidden city, as a symbol of emperor's rights, the architecture was serious and heavy in order to create an eternal and majestic atmosphere to make people feel sublime and to be shocked by the emperor's rights. On the contrary, architecture of the traditional garden intended to reduce its volume and weight in order to integrate better into the natural environment. Big architecture volumes were divided into several small parts to decrease the oppression for nature.

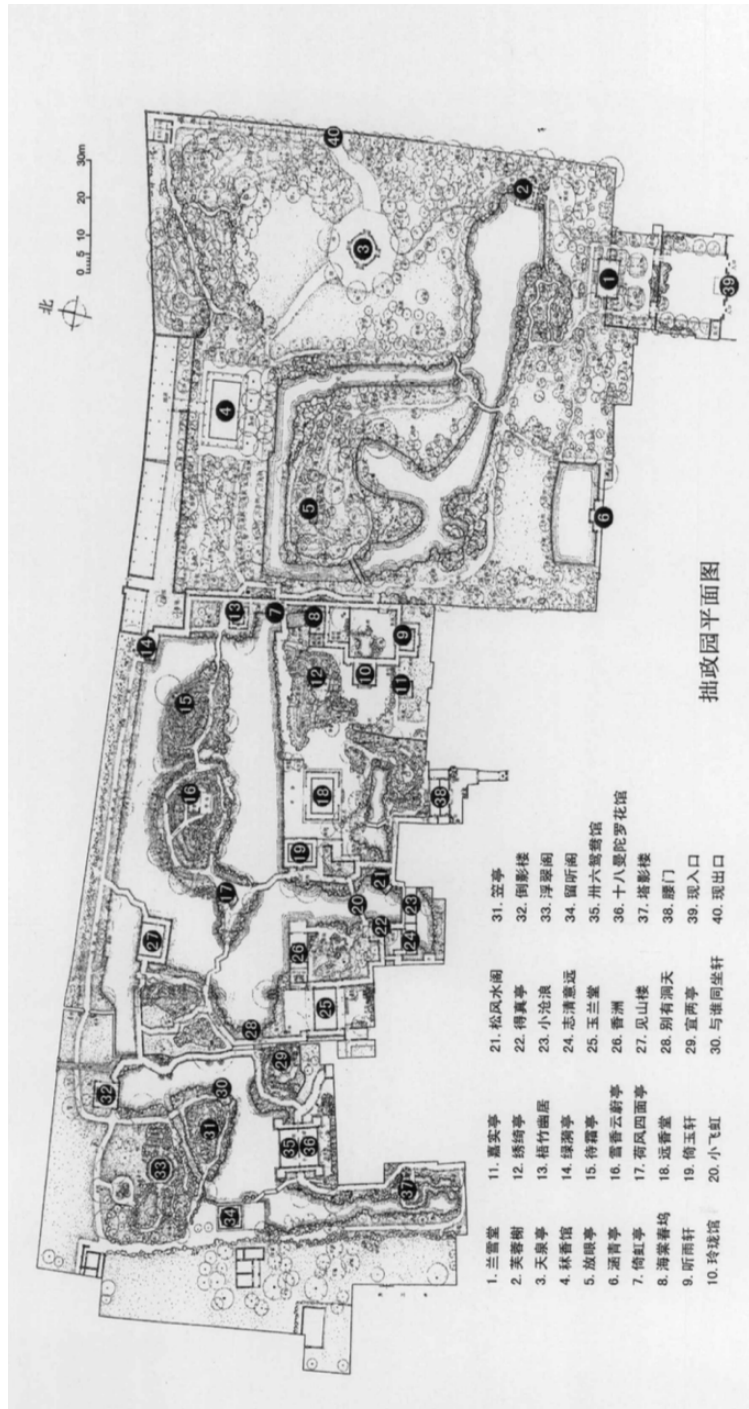


Figure 5.12: Masterplan of Zhuozheng Garden in Suzhou. Compared with forbidden city, architecture distribution is freer. Big architecture groups were separate into small parts and distributed with integration in nature. (Source: Mao, Qihong, 2008. "Big' character research of the Humble Administrator's Garden", thesis of Zhengjiang University.)

Benefit from the good weather condition, architecture could become more transparent and lighter, providing better communications between architecture space and nature. In the Hall Yuanxiang of Zhuozheng Garden, transparent doors which could be opened completely in good weather formed the walls, making the interior space open to the natural environment. Natural scenery could be introduced to the interior space. Architecture space always appeared as a functional extension of the natural environment, rather than a place separated from nature.

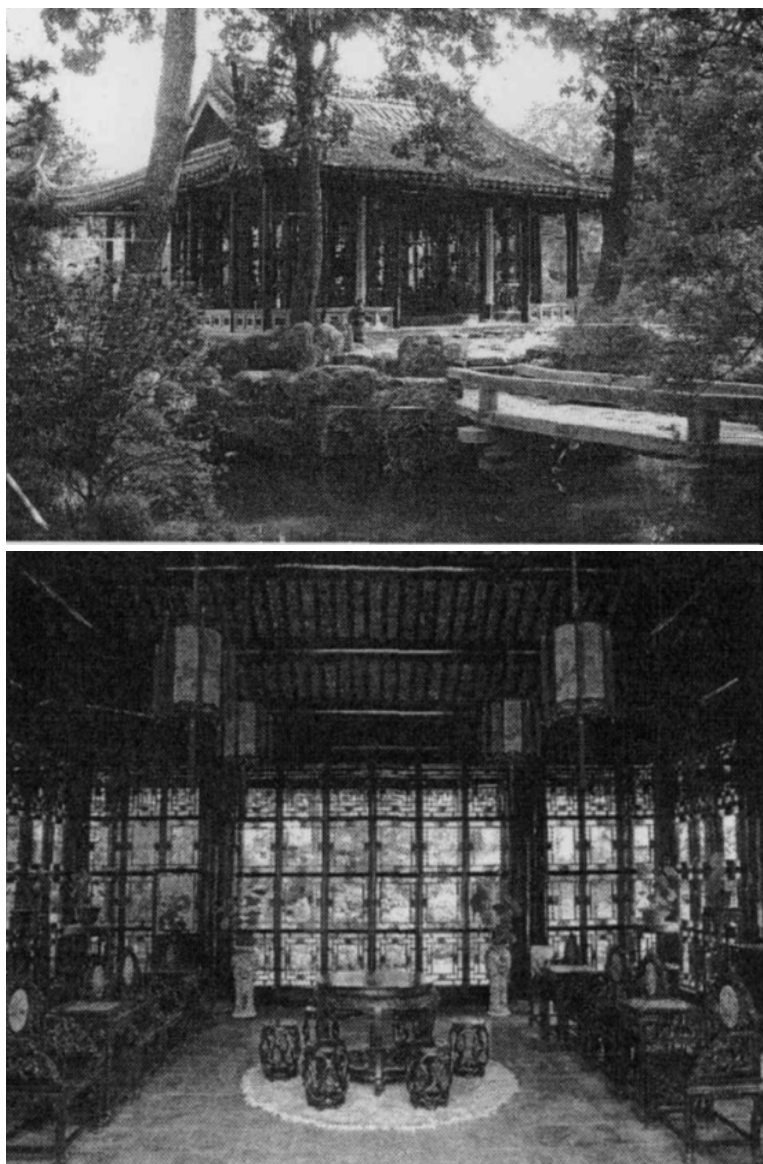


Figure 5.13: Yuanxiang Hall of Zhuozheng Garden.(Source: Mao, Qihong, 2008.”Big’ character research of the Humble Administrator’s Garden”, thesis of Zhengjiang University.)

Apart from the distribution, natural thoughts also could be seen from architecture forms. Irregular lines and curves were more used instead of straight lines in order to adapt to natural shapes. The most important characteristic of the architecture form in traditional Garden is the upturned roof corner. Based on the traditional roof forms, the angle of upturned corners were more exaggerated in Suzhou gardens. As realizing in the main building Hall Yuanxiang of Zhuozheng Garden, the roof corners raised in a great angle of nearly 70 degree. The top girder on the sloping roof was connected to the upturned roof corner by an artistic curve, which stretched into the distance and naturally connected to the hyperbolic curve in the end. With this curve, the big roof seemed lighter and stretchier like floating above the structure. Irregular forms were applied in bridges and corridors. The Feihong bridge in Zhuozheng Garden was designed in an artistic form inspired by rainbows. These irregular forms and curves made architecture as a continue of natural lines and avoided the destruction of natural scene by geometric shapes. Architecture was more alive and stayed more harmoniously with nature.

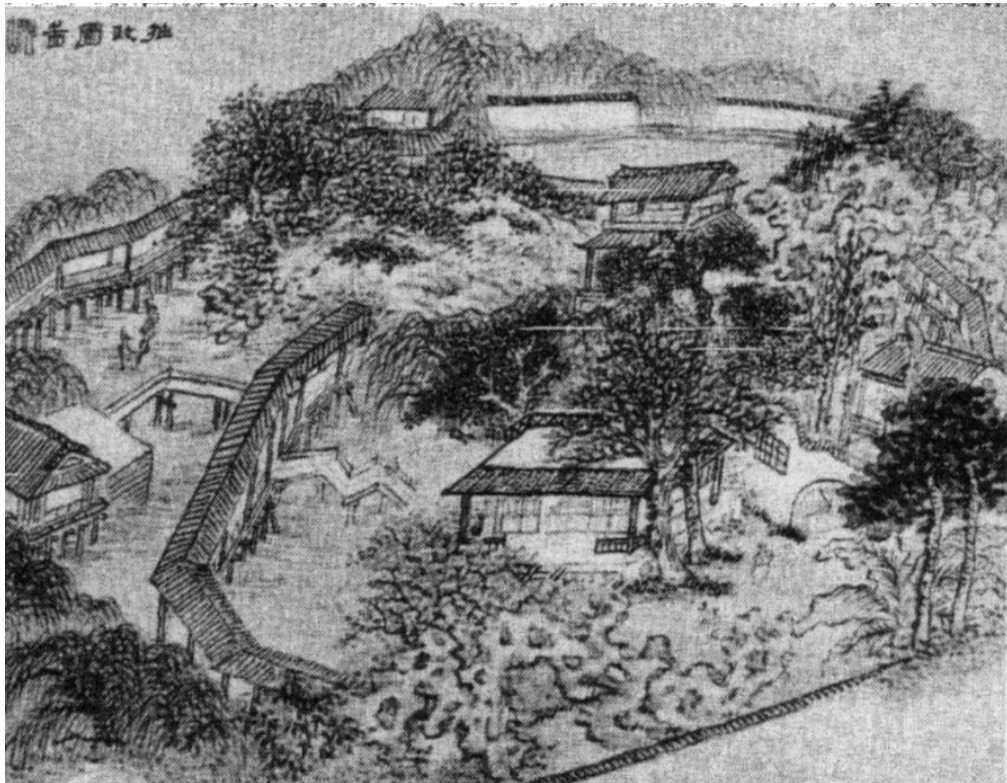


Figure 5.14: Irregular architecture forms stay in harmony with nature. (Source: Wang Yun (Qing Dynasty). Painting of Zhuozheng Garden.)



Figure 5.15: Painting of Small Feihong bridge in curve form. (Source: Liu Dunzhen, 2005. *Suzhou Garden*. China Building Industry Press, 2005. ISBN:9787112074655.)

In addition, landscape design always responded to architecture functions and forms, to strengthen the good relationship between nature and architecture. Architecture space and environment were always reciprocal. Architecture were designed with consideration on the whole environment atmosphere while nature elements varied along with architecture functions. In most Chinese garden, water was treated as an indispensable element and the shapes of water were never simply geometric but adapted to the location, function and atmosphere of architecture. In Zhuozheng garden, around the main building Hall Yuanxiang, the water expanded as a lake adapted to the whole scale of the place. It shrank to a narrow creek when it met the long corridor corresponding to the architecture atmosphere. At the small corner, the water shape changed again to an open pool, forming a independent quiet space together with the small pavilion.

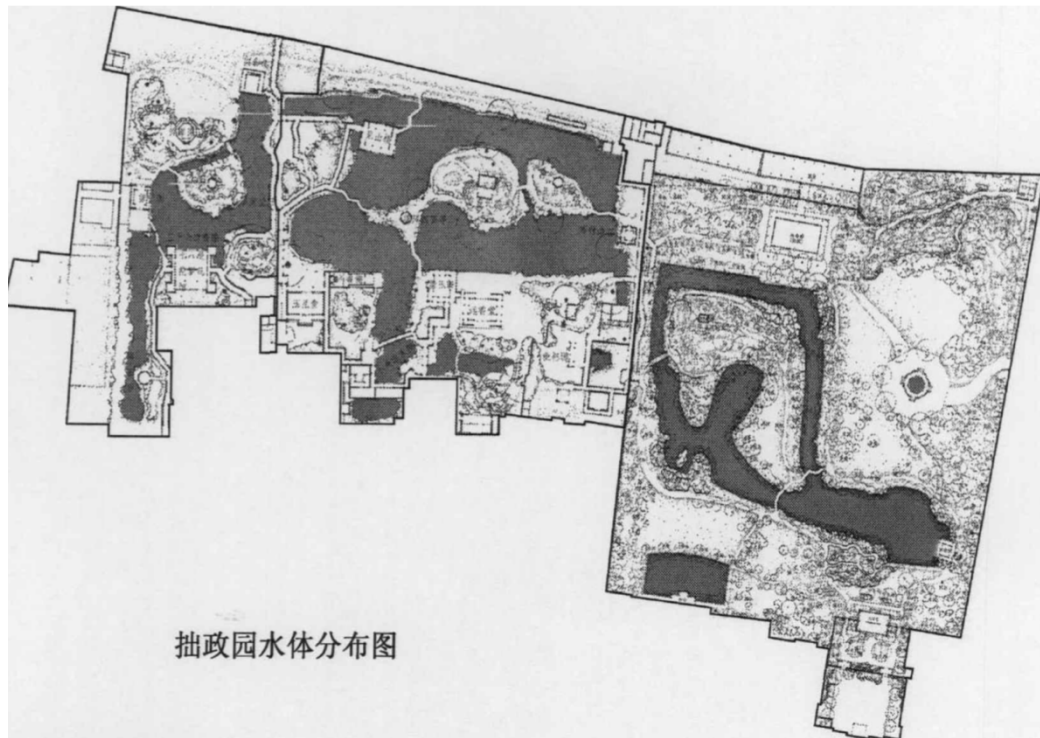


Figure 5.16: Distributions and forms of water in Zhuozheng Park. The forms of water were always adapted to architecture. (Source: Mao, Qihong, 2008. "Big' character research of the Humble Administrator's Garden", thesis of Zhengjiang University.)

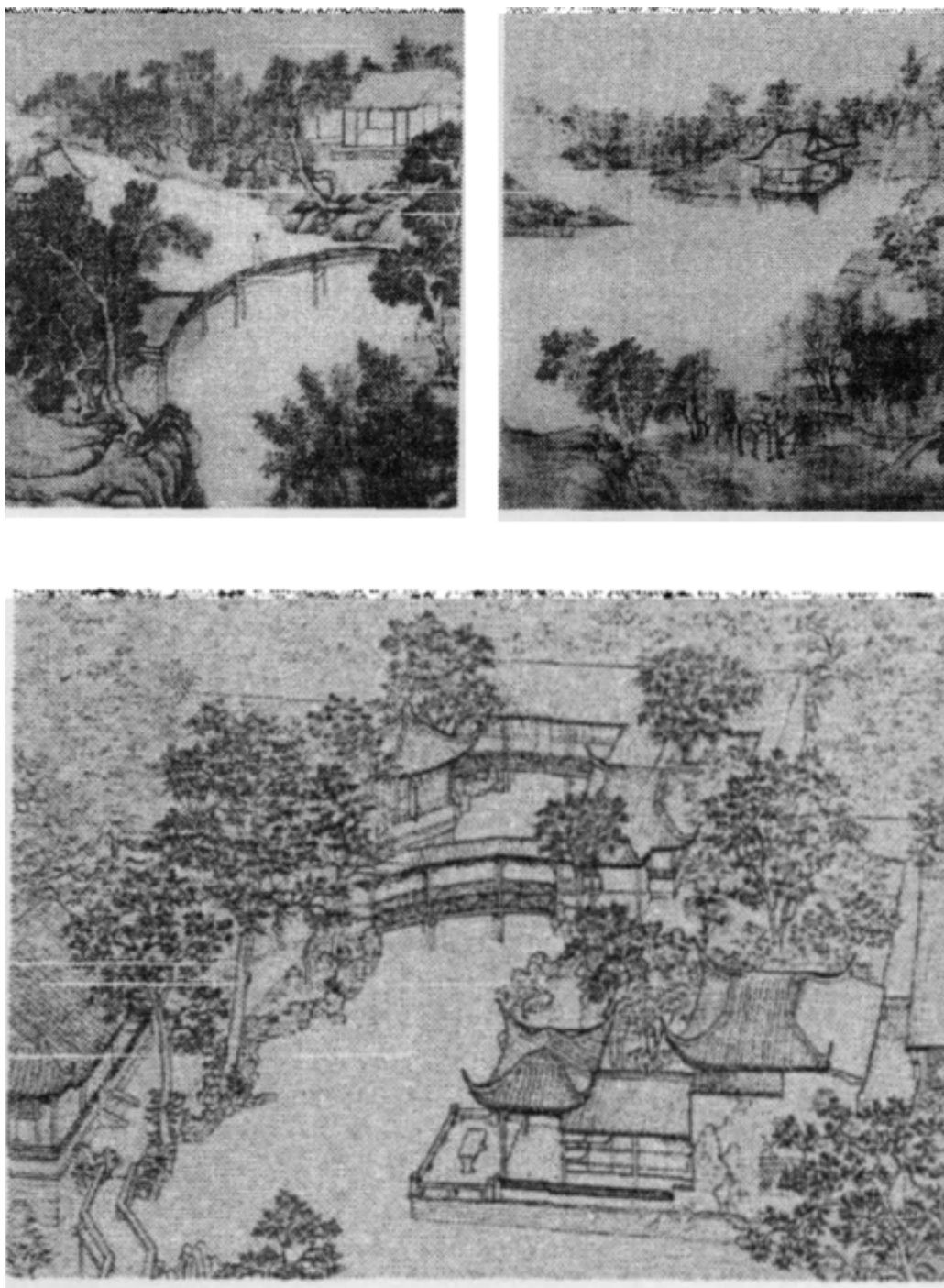


Figure 5.17: The forms of water were always adapted to architecture. (Source: Mao, Qihong, 2008. "Big' character research of the Humble Administrator's Garden", thesis of Zhengjiang University.)



Figure 5.18: Creek along the corridor in Zhuozheng Garden. (Source: <https://www.flickr.com/photos/n0r/453466043>.)



Figure 5.19: Water together forms an open pool corresponding to the change of space. (Source: <http://www.twoeggz.com/picture/2588413.html>)

Nature and architecture creation had been never realized without oriental aesthetic and artistic expression in Chinese traditional garden. Suzhou gardens were always treated as peak works of integrating artistic and esthetic thoughts into architecture and nature. Here, esthetic and artistic expressions had been mainly shown from two parts: form design and emotional atmosphere creation.

In Chinese traditional garden, architecture as well as natural elements had been well designed on their forms. Based on traditional Chinese architecture styles, Suzhou gardens have developed their own rich artistic characteristics. As mentioned in the previous example, a lot of curves were applied in Suzhou garden to constitute the main architecture volumes. Besides, ingenuities of oriental arts and aesthetics have been fully realized in every detail.

The most representative example is the window design in Suzhou garden. According to Chinese artistic graphics, windows have evolved into different art forms. In Suzhou garden, windows were treated as a frame that encircled the scenery, which would form a natural drawing on the wall. Architects thought about windows' own forms as well as their interactions with light and images behind. In different spaces, architects tried to design the most suitable window forms adapted to the space atmosphere and functions, which resulted in the eruption of oriental artistic creations. Graphics of traditional windows always came from life. Some were extracted from natural elements like flowers, animals, plants, rivers, mountains...etc. Some were taken from history stories, like heroes, legendary scene and figures, gods...etc. Geometric graphics were used as basic backgrounds together with the complex meaningful ones. After being abstracted and recreated by artists, traditional windows had obtained their artistic prototypes. Almost every form had its meaning which was always auspicious. Today, many artistic graphics on windows are inherited in contemporary Chinese architecture as symbols of traditional culture and aesthetic.

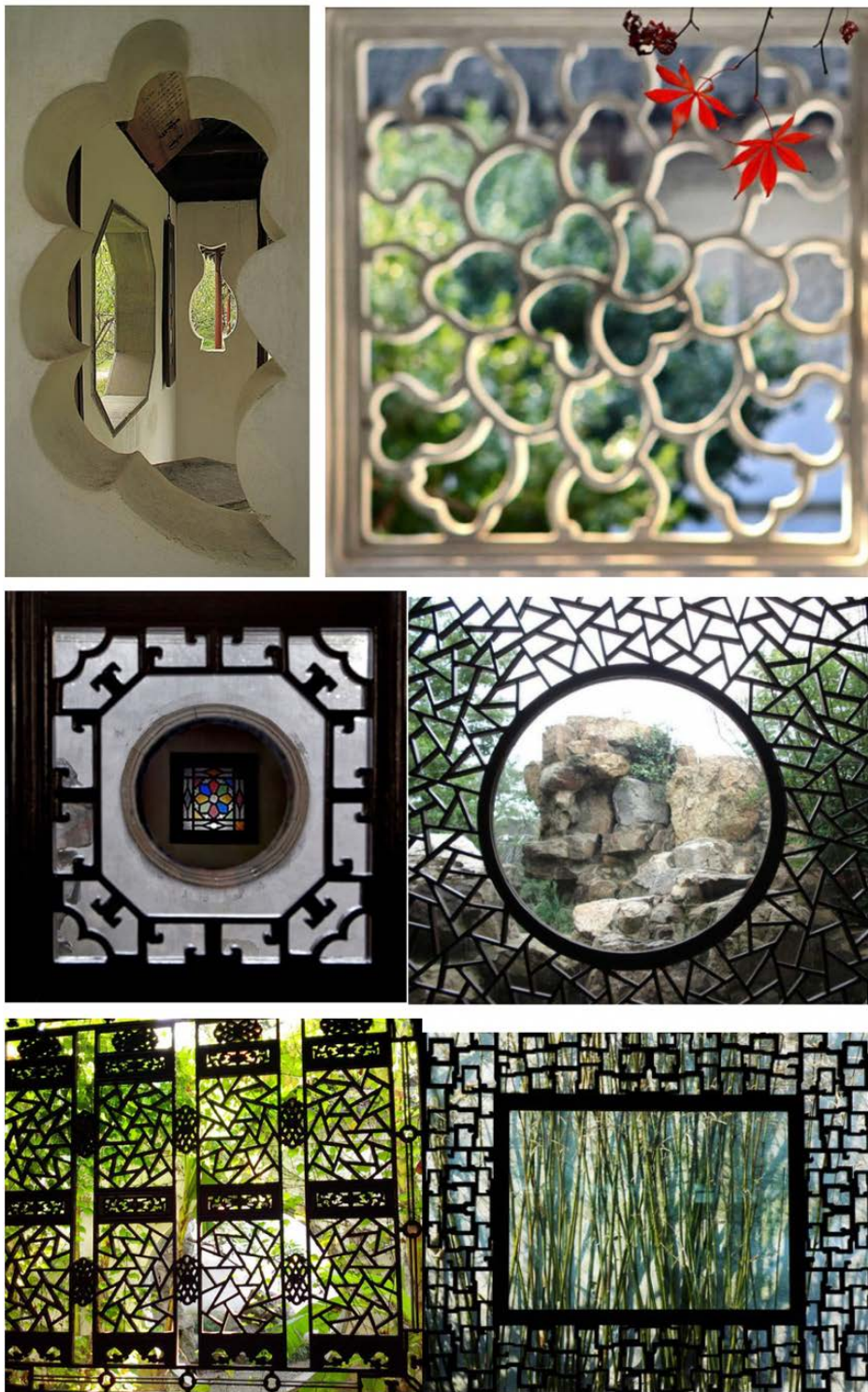


Figure 5.20: Different window forms in Zhuozheng Garden. Basic graphics had been reorganized and formed various window forms. Forms changed to adapt to different scenes behind. (Source: <http://wemedia.ifeng.com/29444105/wemedia.shtml>)

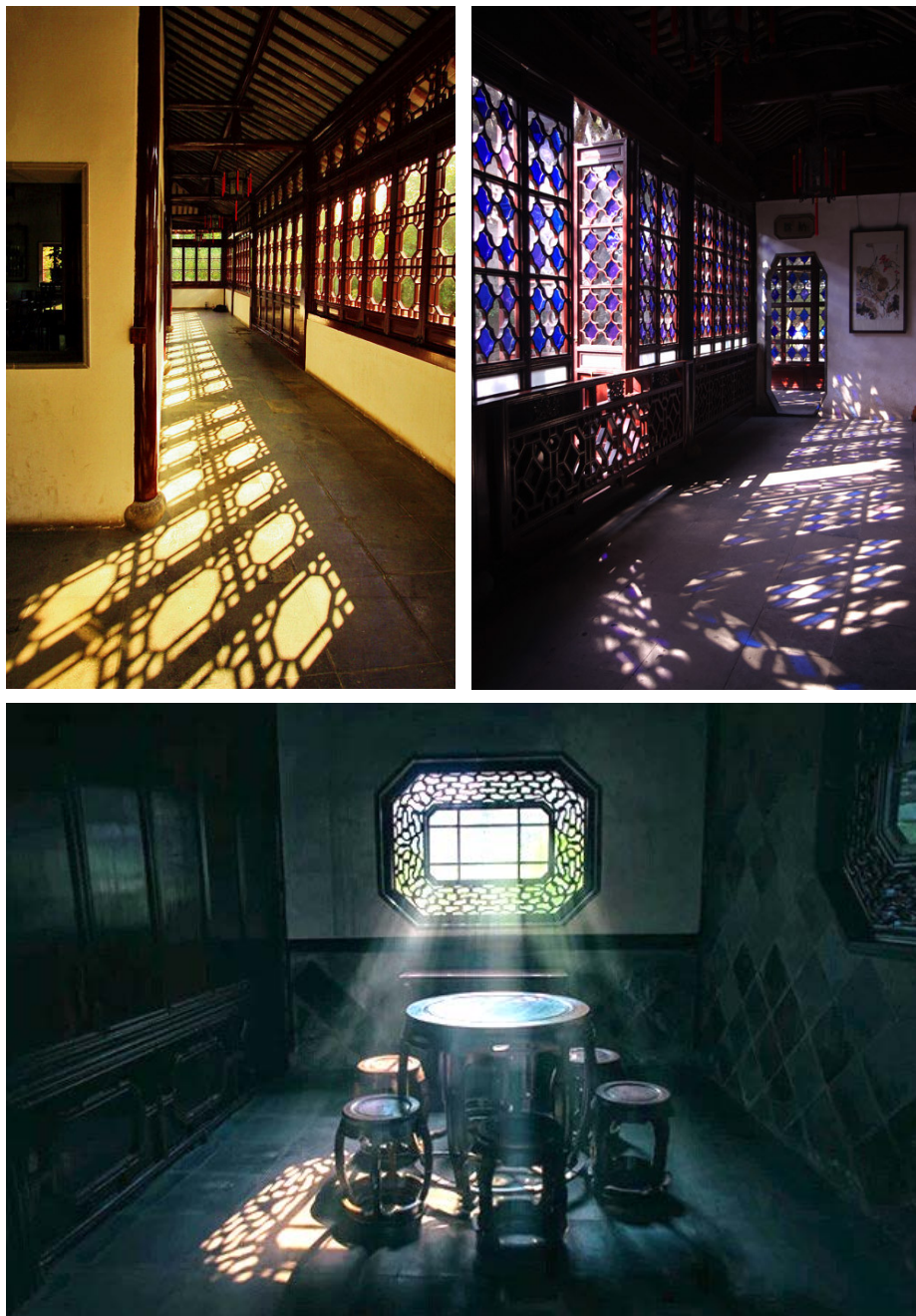


Figure 5.21: Window forms interacted with light in Zhuozheng park. Windows were designed to create different light and shadow effects. Different window forms and colors have changed space atmosphere. (Source: http://www.sohu.com/a/128614432_488635)

Apart from well considerations on architectural details, gardening elements were also carefully designed on their forms to complete the artistic and esthetic expression. Different from European gardens, Chinese traditional garden concentrated on natural aesthetics. Artists and designers preferred more to create an artistic image by natural forms. Their works had always concentrated on looking for nature beauty instead of artificial or geometric forms. This was a basic characteristic of oriental aesthetic and art associated with the cultural concept of respecting to nature in Taoism and Confucianism.

Based on this point, in Suzhou gardens, artists and designers worked to choose most suitable elements to express the beauty of nature. Regardless of seasons, it always showed a unique image integrating different aspects of natural beauty. To realize this, artists and designers valued a lot the form beauty and richness of natural elements as well as the poetic meanings. Landscape design emphasized the variety and connection of scenes, intending to create rich, esthetic and meaningful experience by a series of changing but relative esthetic images while walking. This intention resulted in the high attention to the aesthetics of natural element forms and their combinations or comparisons.

The most representative example is the landscape creation of artificial stone hills in Lion Forest Garden, which is a good witness of the well considerations on natural elements. Corresponding to Chinese philosophy and aesthetics, natural forms were preferred more than the geometric ones. That's why we almost never see a geometric landscape in traditional gardens. Nature thoughts were rooted in traditional Chinese culture. People liked their gardens as epitomes of nature. Based on this point, designers liked to choose different elements directly from the nature to keep the natural beauty to the greatest extent in their gardens. In Lion park, stones to make the artificial hills were all taken from nature —— Tai Lake. It is a lake near the city where the stones were natural sculpted by the water, which made them have high artistic forms. Till now, stones from Tai lake are still famous as good decorative elements because of the special forms. The stones here have four common aesthetic characteristics: thin, wrinkled, leakage and through. These characteristics present the stones with light, lively and artistic appearances.

The combination of these stones was not a simple process of accumulation but an artistic recreation according to the characteristics of real mountain. Stones with different characteristics were distributed to form caves, peaks, valleys which were all features of a real mountain. The combination had followed some rhythms to avoid disordered feelings. It is an artistic creation not only trying to make a rich image of nature, but also providing a fully experience of those essentials of wild mountain.

Artistic creation had never separated from imagination. In Lion Forest Garden, stones forms were not only chosen to express natural features but also animals — the lions. That's why it was called Lion park. Some stones looking like lions were distributed to present a livelier image that lions were playing in the mountain.

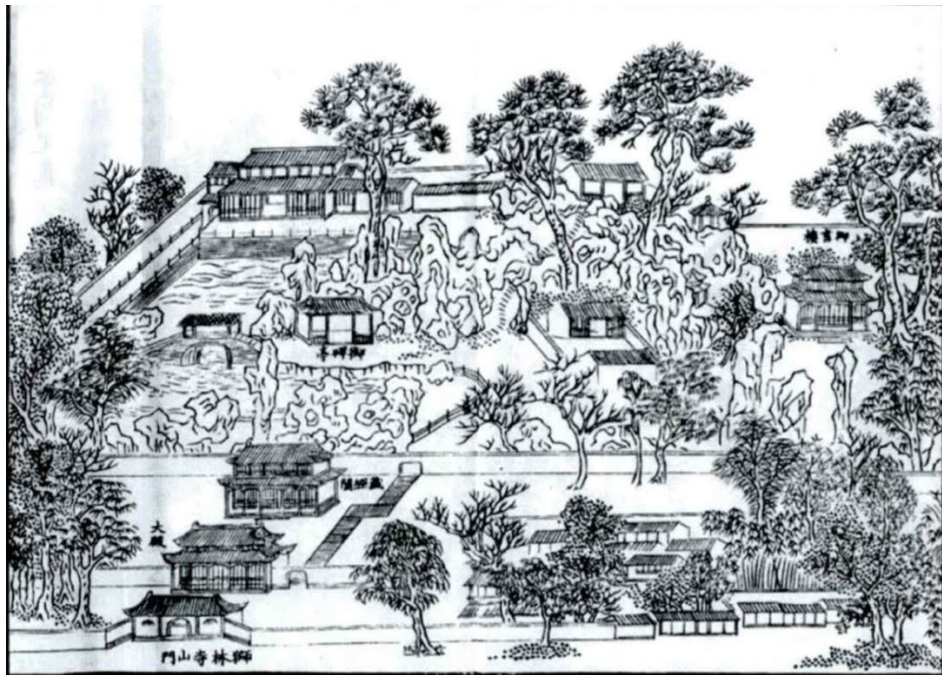


Figure 5.22: Artistic concepts of the artificial hill in Lion Forest Garden of Suzhou. (Source: Shi Daoxun, (Ming Dynasty); Xu Lifang (Qing Daynasty). *The Atlas of Lion Grove*. Guangling Bookstore Jiangsu Guangling Ancient Book Press, 2007.)



Figure 5.23: General view of the artificial hill in Lion Forest Garden of Suzhou. (Source: Li Yang, 2013. “The Comparative Study of Wenyuan Lion Grove and Suzhou Lion Grove”, Beijing Forestry University.)



Figure 5.24: Stones from Tai lake that made up the artificial mountain. Every stone kept its natural and unique features. (Source: Li Yang, 2013. “The Comparative Study of Wenyuan Lion Grove and Suzhou Lion Grove”, Beijing Forestry University.)



Figure 5.25: Contemporary painting of the artificial hill in Lion Forest Garden by Wu Guanzhong, 1983. Free and flying curves fully present the unique, natural and sculptural features of stones. (Source: Wu, Guanzhong, 1983. *Wu Guanzhong's Works*. Hunan Fine Arts Publishing, 2007. ISBN: 9787535626141.)

Emotional atmosphere creation is another important aspect of Chinese arts and aesthetics. Atmosphere creation is a way to realize the communication between people's mind and architectural or artistic works. It is a spiritual expression of artists, creating influence and reflections on people's emotion. Wang Kuowei, a Chinese famous scholar, writer and poet, had wrote about atmosphere in his book "Jen-Chien TZ'u-hua"⁹⁸ that the atmosphere is not only the realistic environment. It is also people's mood, like happy, sorrow, angry or sad. Chinese traditional artists thought that a good artistic work had to present an atmosphere which was a true emotion generated after the observation and experience of the environment. Forms always served to create an emotional atmosphere. Compared with European classical painting, Chinese traditional painting didn't focus on the reality and perspective of image. Instead, it concentrated on emotional expression. Chinese arts pay much attention to interactions between artistic works and people's mind. Artists painted not to record the real scene but to pass the true emotion and their thoughts to people. This concept also inspired western contemporary art and architecture. Many contemporary concepts were rooted in Chinese traditional arts. Chinese traditional painting didn't talk about arts

⁹⁸ Jen-Chien TZ'u-hua, written in 1910, is one of the most important books of Wang Kuowei. It is a study in Chinese Literary Criticism.

anatomy. Chinese artists used more simple and free lines to depict the main characteristics while ignoring those unimportant details and proportions of each part. Chinese painting always tended to a flat expression and attached much importance on poetic feelings. Sometimes, they expanded these characteristics to emphasized their thoughts and emotions on the work. What they were seeking wasn't realism but an emotional atmosphere.



Figure 5.26: Landscape painting by Tang Yin, famous Chinese scholar, painter, calligrapher, and poet of the Ming dynasty. (Source: Top 100 works of Tang Yin. blog.sina.cn.)



Figure 5.27: Figures by Tang Yin, famous Chinese scholar, painter, calligrapher, and poet of the Ming dynasty. (Source: Top 100 works of Tang Yin. blog.sina.cn.)

In Chinese traditional garden, emotional atmosphere creation was realized from many aspects. As said before, many artists or poets had participated in the design of the gardens. They had joint art methods and philosophical thoughts in space creation. As a continue of Taoism, the comparison of tangible and intangible was widely used to create artistic and poetic atmosphere, intending to generate emotional reflections. The most representative method was the introduction of “leave white” concept. Artists had introduced this painting method in architecture to create a picturesque scene by architectural elements. The white walls acting as a background like the painting paper worked together with the gardening elements like plants and stones to present a three-dimensional poetic painting. Like the traditional painting, the white was wall never filled up by decorations. “Leave white” gave the whole space a rhythm with emphasizing the focus. This method created a strong artistic and poetic atmosphere to involve a emotional reflection of Chinese traditional art and culture. Besides, the white pure wall increased people’s feeling of detached secular and left people with more imaginations.



Figure 5.28 & 5.29: Introducing “Leave white” method from Chinese traditional painting. (Source: <http://www.baidu.com/>)

In Zhuozheng Garden, most buildings were distributed along water to make an interaction between architecture and nature. The water reflected the architecture, which enriched the level of space. The comparison between real and virtual worked to take people to the poetic world. What's more, the interaction with time was another method that couldn't be ignored of poetic and philosophical atmosphere creation.

Artists chose plants based on their habits and mixed plants of different seasons. The plum flowers and those evergreen trees were always used to form a lively atmosphere in winter. The beautiful colorful flowers were also planted to bloom in the spring. The maple trees that would have gorgeous red leaves in autumn could also be seen in many places in the garden in order to enrich the autumn scenery. In summer, the lotuses were full of lakes making the garden filled with green lives. These plants had be combined based on time to keep the artistic and natural atmosphere the whole year. Along with time passing, the garden presented completely different scenes. The colorful spring, green summer, red autumn and white pure winter created poetic atmospheres changing with time, generating emotional reflections of time and life. People could feel the flowing time and the vicissitudes of the world, thinking deeply about the presence of life.

2. Explorations of Chinese contemporary architecture inheriting traditional Chinese culture

Affected by globalization and the pursuit of economic development, Chinese architecture has lost its characteristics during a long period. New material, new technic and industrial design process brought Chinese architecture high economic benefits while forgetting humanistic essence. Chinese architecture in the last years is losing its cultural identifies and memories. Many people, especially old people would feel unfamiliar to modern cities because of the loss of culture identifies. Many familiar images in their memories about the city have disappeared. This situation would create an unsafe feeling to old people. In China many old people don't want to leave their old houses to the modern cities because of their requirement of sense of belongings about culture, environment and memories. On this point, Chinese contemporary architecture, especially elderly housing, needs to keep its cultural identifies to generate effective emotional reflections to satisfy the requirements of living space for the elderly.

Rooted in Chinese culture, Chinese traditional architecture has formed the own images with strong identifies. Chinese contemporary architecture should inherit these essential things of culture. However, contemporary architecture couldn't copy or imitate the traditional ones directly. Apart from cultural identifies, contemporary architecture should be adapted to contemporary social needs. Architecture is improving. Architects should design based on new requirements of people and society, finding new ways to inherit, develop and integrate cultural essential in contemporary era.

Rehabilitation of Wen village

Wang Shu, the winner of Pritzker award of architecture of 2012, is a representative of Chinese contemporary architects. He is trying to create space combining traditional culture with contemporary characteristics. The rehabilitation of Wen village is his recent work. As doing in other projects, Wang Shu's projects are always rooted in local culture and memories. He likes keeping old elements as symbols of the uniqueness of local culture and memories but integrates with contemporary aesthetics and orders.

Wen village is situated in Zhejiang province to the south-east of China. Like most small old villages around, Wen village is very typical. It has kept all the cultural and traditional characteristics of Chinese rural architecture to the south-east: attaching much importance to natural environment, being constructed along river, houses with white or earthen walls, grey tiles, bricks and small patios inside. For local people, it is just one of the most normal villages and also the most familiar living environment. The long history, natural characteristics and local life habits have given this village its cultural identifies.



Figure 5.30: Wen village before rehabilitation. (Source: “Wangshu and his first project for rural village.” Design blog.)



Figure 5.31: Wen village before rehabilitation. (Source: “Wangshu and his first project for rural village.” Design blog.)



Figure 5.32 & 5.33: Wen village before rehabilitation. (Source: “ Wangshu and his first project for rural village.” Design blog.)

Wen village has similar situations to most Chinese villages that the majority of the residents are elderly people and children. Young people prefer to leave to big cities to find better work opportunities while elderly people staying in their familiar environment and keeping the most traditional habits. They suffer from the inconvenience of living conditions but maintaining deep affections for the habitual culture and environment. Rehabilitation is a way to improve their life qualities both in material and spiritual. Eliminating life inconvenience should realize without disrupting local characteristics and life pattern.



Figure 5.34: Residents in Wen village. Old people are the main residents here like most Chinese small villages. They have kept their habitual life pattern and had the most deeply emotion to their home.(Source: Chao, 2016. "Visit to Wencun Village", *Douban blog*.)

Wang Shu has just designed based on these local residents' needs. He thought contemporary architecture couldn't be separated from the original environment. Architecture has life. Local culture and environment is his identify. Contemporary Wen village needs to be as if it grew up naturally from the environment. What he should do is to inherit local things and developed them adapted to contemporary requirements, rather than to create a new environment.

In this project, he designed for 24 families. Houses can be divided into 8 main models. While every house in the same model is different depend on the requirements and environment conditions of every family.



Figure 5.35: Masterplan of Wen village project. (Source: "Renovation of Wencun Village". Architectmagazine. March 03, 2017.)

Respecting to nature was considered as a basic design concept which should be inherited. From the field research of the old village, Wang Shu found that streets in the village were always very narrow. On As living space originating from the dwelling desire and requirements, this particular village image with narrow streets is affected by and reflects the life styles and social relationships: in past, every family in this small village stayed in close relationship with neighbors. On the other hand, Wang Shu thought it was an inevitable result of Chinese traditional culture. As said before, Chinese traditional thoughts on architecture has always followed the principle of respects to nature. Narrow streets had reduced the occupation of natural land by the village. Wang Shu had commented: *“Why is the road so narrow? The ancestors just wanted to leave to the nature. This is a sense of survival and also a very simple ecological consciousness.”*⁹⁹



Figure 5.36: Original road scale.(Source: Photo By Zensic.)

⁹⁹ Jin Bin, 2015. “Master Wang Shu and Wen village”. *Zhejiang Daily Newspaper online*, 12-1,2015. Website: <http://zjnews.zjol.com.cn/system/2015/12/01/020933927.shtml>

In the masterplan, Wang Shu kept the original village texture to the greatest extent avoiding the disruption of natural environment. Houses maintained the close relationship with each other and with nature. While he also thought about contemporary social needs. Roads' scale redesigned to permit the access of cars which gave a lot of convenience for local people.



Figure 5.37: Bird view of the whole project. Architecture has kept its close relationship with nature (Source: Photo By Zensic.)



Figure 5.38: Architecture has kept its close relationship with nature. (Source: “Renovation of Wencun Village”. *Architectmagazine*. March 03, 2017.)

House model also inherited traditional characteristics. As a symbol of traditional Chinese culture, central patio was kept and a small entrance yard was distributed for every house. Original life pattern was maintained with providing more space for daily life. This house model has inherited the good conditions of ventilation and made the interior space connected to nature. Moreover, Wang Shu has adjusted the thickness of walls to create a better temperature and acoustic environment.



Figure 5.39: Central patio inside new house.(Source: Chao, 2016. “Visit to Wencun Village”, *Douban blog*.)



Figure 5.40: Central patio inside new house. Central patio has connected the three floors.(Source: Chao, 2016. “Visit to Wencun Village”, *Douban blog*.)



Figure 5.41: Local elderly take advantage of the entrance yard for their daily life. (Source: Chao, 2016. “Visit to Wencun Village”, *Douban blog*.)

For Wang Shu, local materials carry the memories of the site. They are the most direct symbol of cultural identities. In Wen village, white walls, yellow clay, grey local stones and bamboo are the most commonly used materials. Wang Shu insisted to use these local materials in his project. He thought these local materials had their special textures. It is the uniqueness of this village and couldn't be forgotten. Moreover, local material can made new houses stay in harmony with the old ones. Apart from local materials, Wang Shu thought some good traditional technic also should be inherited. In his projects, he continued the traditional construction method of yellow clay wall. The yellow clay was specially treated by crushing, washing, and screening. In this way, the walls were constructed more tough, smooth and breathable. He used bamboo as pillares, not only to support the eaves, but also to hang clothes and crops. This is reminiscent of the most traditional life style in this area that people extend a bamboo pole outside the window to hang the clothes.



Figure 5.42: Yellow clay wall with pillares of bamboo. (Source: Photo By Zensic.)



Figure 5.43 & 5.44: A bamboo extending outside windows to hang clothes is the most typical and traditional life style in this area. (Source: “Clothes pole in memory”, *Wenxuecity*, 2015.<http://bbs.wenxuecity.com/memory/753401.html>)

Wang Shu found old bricks from those abandoned old houses and used them directly in new houses to create emotional reflection of memory. It was interesting that Wang Shu put those different styles of bricks together in a free order in order to create a natural sense. His design always avoided industrial traces. He liked using the most natural and cultural ways to interpret contemporary esthetic concepts.



Figure 5.45& 5.46: Brick walls (Source: Photo by Zensic.)

Architecture form has inherited Chinese traditional aesthetics as a base. Contemporary esthetic concepts were also integrated to provide a new image of Chinese contemporary architecture. Wang Shu kept the basic colors of this village: white, grey and wood color. Slope roof was also kept in a more geometric way. The curve eaves were simplified. Windows on the white wall were kept in the original styles and scales but with a more freely order. Bamboo and wood formed doors and inside walls with the same proportions to the traditional architecture while the complex decorative graphics were also simplified. This made the houses local as well as contemporary.



Figure 5.47 & 5.48: Contemporary houses have maintained similar proportions to traditional architecture. (Source: Photo by Zensic.)

As doing in Chinese traditional garden, Wang Shu paid attention to detail design and atmosphere creation to complete his concepts of contemporary Chinese aesthetics. He was inspired by the traditional form and atmosphere creation methods in Chinese traditional gardens. He was always looking for some connections between his architecture and traditional forms or concepts, like the artistic form of doors or windows. Moreover, like in traditional garden, his buildings also presented good interactions among architecture, light and plants to create an artistic atmosphere. White walls played as a role of drawing paper. Light, plants, shadows and white walls together formed a Chinese painting in tree-dimensions. Windows' forms were also well-designed interacting with the landscape.



Figure 5.49: Artistic form of door inspired by traditional garden.(Source: Chao, 2016. “Visit to Wencun Village”, *Douban blog*.)



Figure 5.50: Interaction among architecture, light and plants shadow.(Source: Photo by Zensic.)



Figure 5.51: Interaction between architecture and bamboo.(Source: Chao, 2016. "Visit to Wencun Village", *Douban blog*.)

Wang Shu's architecture has made an example of Chinese contemporary architecture. His architecture has inherited the culture identities of the area. He extracted essential elements from traditional culture and architecture, both tangible and intangible things, and tried to adapt them to contemporary requirements. As he said, contemporary architecture was never separated from the local culture. Contemporary refurbishing is not to destroy and created new things, but to make the original ones naturally grow up with contemporary meanings



Figure 5.52: New image of Wen Village. (Source: Photo by Zensic.)

Chapter 6

Two Contemporary Elderly Housing Refurbishing Cases Study on Aspect of Emotional Design in China and Europe

According to former studies, emotional design in contemporary elderly housing refurbishing should be carefully considered to satisfy elderly's need as well as providing a living space with contemporary meanings and value. Emotional design in elderly housing refurbishing should always adapt to social and culture identities with comprehensive considerations on every emotional level to generate a whole emotional affect. Today, both in China and Europe, many architects have already attached much importance to emotional design and tried to realize in their refurbishing projects, exploring new elderly housing model for contemporary society. In architectural refurbishing projects, different emotional design methods should be integrated with well consideration, to make a mutual improvement of emotional experience.

1. Emotional design study in the contemporary refurbishment of Flix assisted residence and day center

Felix elderly housing is located in the village of Flix, Tarragona province of Spain. The Spanish longest river Ebro passes through this village and leaves the village with fantastic natural views. The village has kept traditional images of Catalunya both its landscape and architecture. The elderly residence was developed based on an old school of the village. This school was treated as a symbolic place of this village: many old people here were graduated from this school which kept all their memories of youth. When the government decided to rehabilitate the old school to elderly residence, local elderly said they wanted to go back to the familiar place to live. Memories and experience created emotional connections with the elderly, and satisfied their desires for living space, a place where represented themselves, where they felt safe, natural and free.

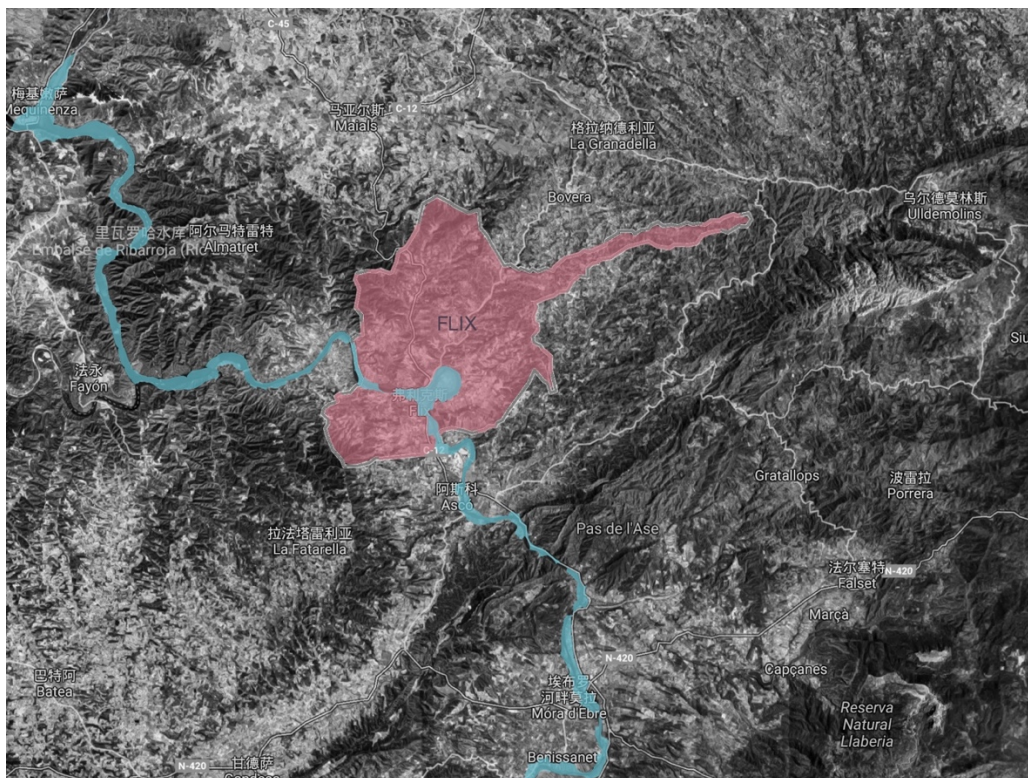


Figure 6.1: Site of Flix Elderly Residence. (Source: Google maps. Program by the author.)



Figure 6.2: General view of Flix village (Source: website of government of Flix.)



Figure 6.3: The existed old school of Flix. The architecture is surrounded by natural landscape. (Source: provided by Luis Bravo)

Luis Bravo, architect of this project, always wanted to keep the emotional connections in the refurbishing. Respecting to the existed landscape and architecture, he tried to create a comprehensive emotional affect from different architectural aspects and levels, associated with visual aesthetic impressions, using experience and reflections of memories, culture and personal identities:

“The project is developed based on a priority consideration: the urban and topographic configuration of the site, the existing vegetation in it and the views over the river. What is sought is to create an optimal physical and spatial relationship between the existing building to be rehabilitated and the new volumetry.” Said Luis Bravo

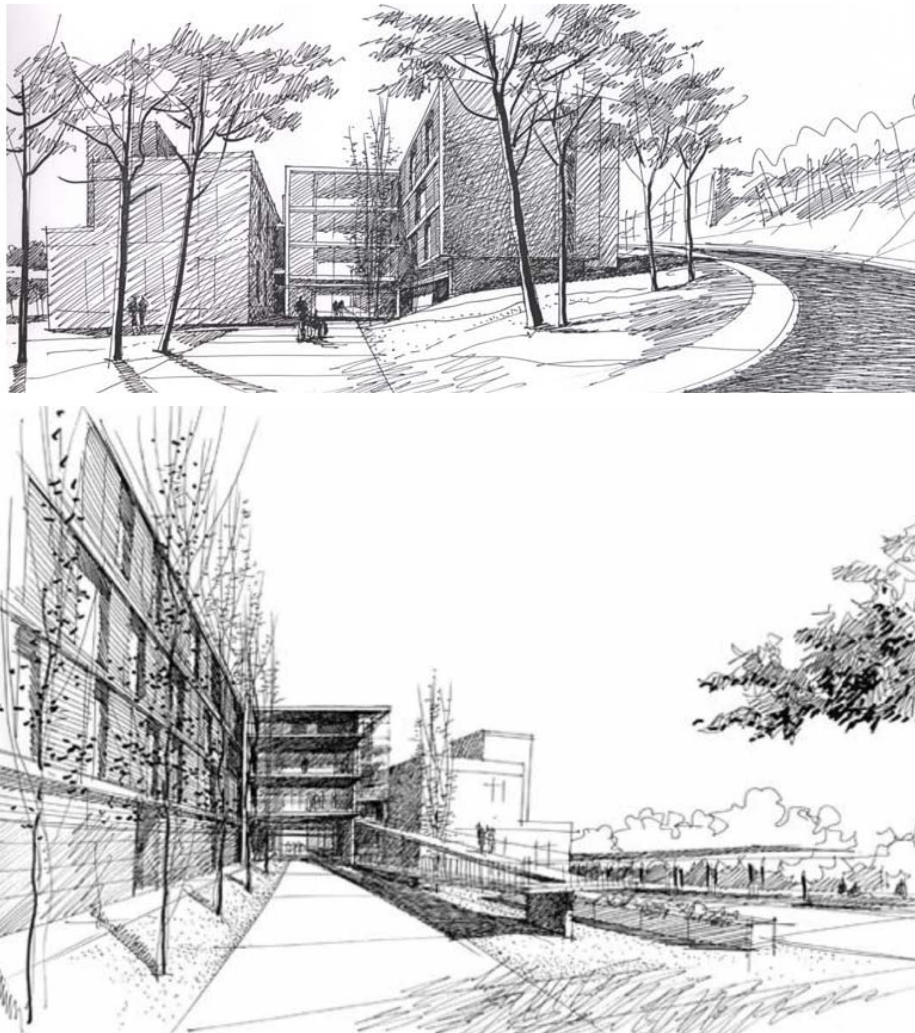


Figure 6.4 & 6.5: Conceptual sketch of the refurbishment. (Source: provided by Luis Bravo)

1.1 Architecture appearance

In this project, the existed old school was carefully kept and reused in new ways. To meet the requirement of functions, space expansions are necessary. After particular considerations, new architectural volume was designed with full respect to the original characteristics on architectural shapes and scales. New volume was presented in a modern style. However, the rhythm and scale of the facade were designed always corresponding to the original one. New and old parts were connected by a half-opened space, integrating the two parts as a whole. Metal window blinds continued from the new part to the old one, further combining the old and new parts from architectural visual appearance. The whole volume kept the original human-friendly scale, providing an intimate and safe atmosphere for the elderly.

Interior space also kept its original appearance, with traditional Catalan architectural structures. The brick arches, which could be always seen in traditional architecture, represented the most typical form and technic of Catalan architecture. The maintenance of these characteristics provided familiarity and special aesthetics to space, attracting local elderly by first impressions, which furthermore created memory and culture reflections.

In the facade to the west, bay windows with special angels were designed towards to the sunshine and view. Besides functional use, it also made architectural appearance livelier and more artistic, bringing passions and energy to the space. This concept could be also seen from the design of color.

The interior spaces were painted by different lively colors depending on functions, attracting people's attention by first sight. And the decorations of rooms were also in different colors: the colorful curtains could be seen from the window, space appearance being presented in a lively, active and energetic image.



Figure 6.6: General appearance of the refurbishing project. New and old parts are integrated by similar rhythm, scale and architectural elements. Project was refurbished with particular respect to the original characteristics. (Source: provided by Luis Bravo)



Figure 6.7: Metal window blinds continued from the new part to the old one, further combining the old and new parts from architectural visual appearance. (Source: provided by Luis Bravo)



Figure 6.8: Different colors make the space appearance be presented in a lively, active and energetic image.
(Source: provided by Luis Bravo)

1.2 Functions and Utility

Distribution

Architecture space was always considered to provide good using experience and high life qualities for the elderly. Different functions were clearly distributed according to space conditions. The existed old building was reorganized with new functions of reception, management and a day center for common activities, which provided basic supports for the elderly. New volumes, which could achieve a balanced sunning of all rooms, were used as dormitories and daily activity

space. Outdoor spaces were always landscaped with different characteristics according to the uses to which they would be allocated.

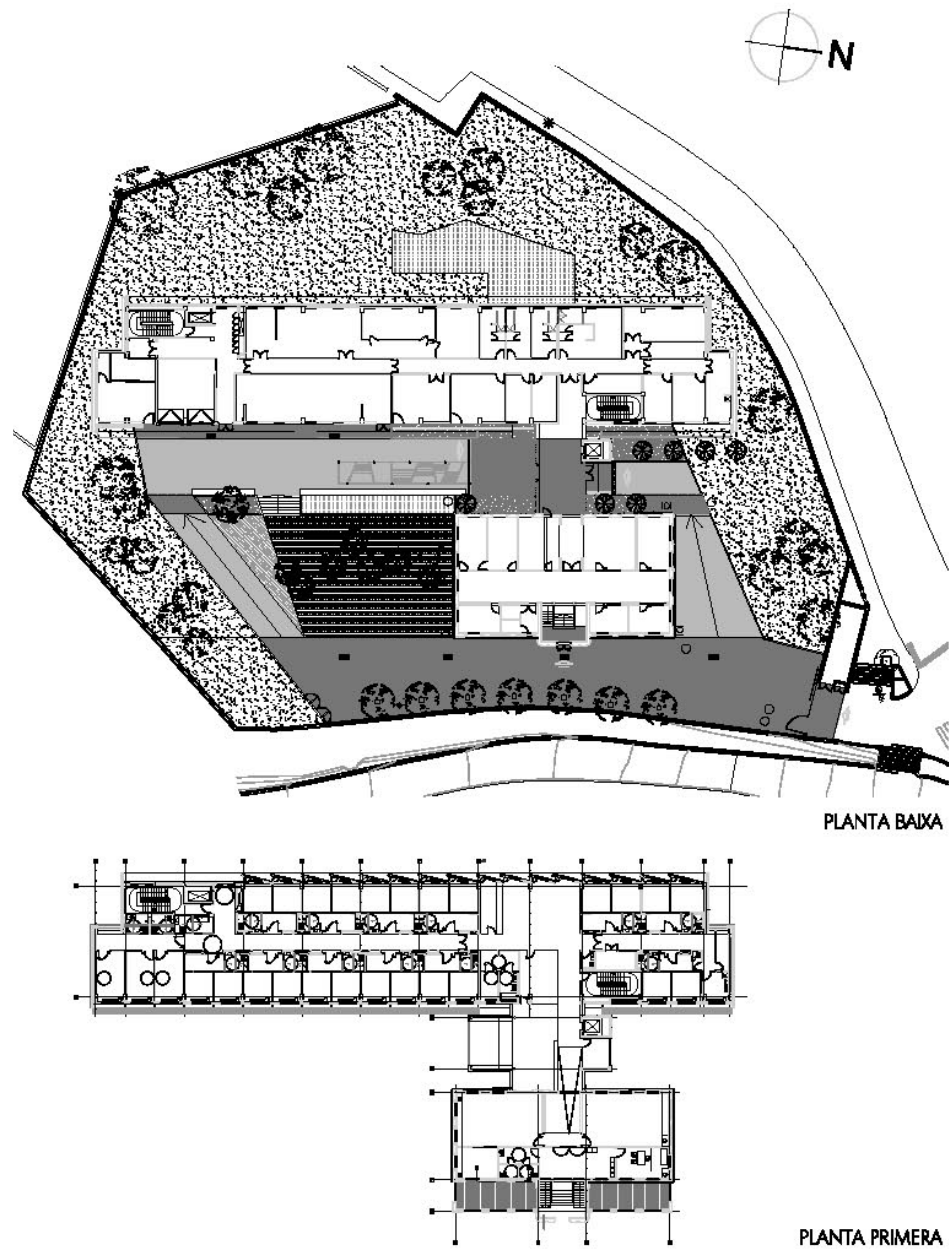


Figure 6.9: Plan of the project. (Source: provided by Luis Bravo)

Connection to nature

According to the former studies, living space should always have characteristics of safe, natural and free. Natural elements, as natural light, vegetations, and other landscapes, are necessary to meet elderly people's mental requirements for living space, providing a relaxed, comfortable and pleasure atmosphere. In this project, nature was a core concept. Thanks to the Ebro river, the site was surrounded by rich natural resources. The existed vegetations and river have offered a great natural living environment as well as esthetic experience of view.

In the planification, architect intended to keep all the existed natural resources and introduced them into architectural space. Rooms were designed with terraces where the elderly could enjoy the view of nature. At the same time, natural light could enter through big windows. The elderly can enjoy sunshine as well as natural view in their own rooms.

“With regard to outdoor spaces, the existing vegetation is maintained, complemented and maximized, so that its view can be enjoyed from the wide and sheltered terraces arranged at all levels.” Said Luis Bravo.

Special half-opened spaces were distributed between new and old volumes. While connecting the two parts of architecture, it provided a wide space where elderly could stay and enjoy the whole atmosphere and view of nature. This space was covered by special metal blinds. It was transparent from inside but opaque when looked from outside. While creating a natural atmosphere, it also provided protections to the interior space. Elderly could enjoy the natural without any visual occlusions, which made them feel being protected.



Figure 6.10: Open space between new and old parts, providing a complete experience of nature. (Source: provided by Luis Bravo)



Figure 6.11: Open space between new and old parts. Special metal blinds provided protections from outside. (Source: provided by Luis Bravo)



Figure 6.12 & 6.13 & 6.14: Architecture volumes were always accompanied by landscaped outdoor spaces with different natural characteristics according to the uses to which they will be allocated. (Source: provided by Luis Bravo)

Public space, accessibility and healthcare

Public space provides possibilities to make elderly interact and communicate with the society, preventing their negative feelings of unsafe and lonely. In this project, a series of public space with different functions of restaurant, activity center, rehabilitation center, were distributed to create richer life activities for elderly.

All spaces were equipped with necessary accessible facilities to create a more convenient and safer living environment for the elderly. Artificial lights were combined with natural light to always provide sufficient illuminance and comfortable light environment. Moreover, all materials were chosen with careful considerations on healthcare. Special and environment-friendly rubber with different colors was used as pavement. It created warm and soft feelings and protected the elderly from hardly hurt. The different colors made it easier for elderly to remember the circulations.



Figure 6.15: Daily activity center. (Source: provided by Luis Bravo)



Figure 6.16 & 6.17: Restaurant.(Source: provided by Luis Bravo)



Figure 6.18: Rehabilitation center. (Source: provided by Luis Bravo)



Figure 6.19: Rehabilitation center. All spaces were equipped with necessary accessible facilities to create more convenient and safer living environment for elderly. Special and environment-friendly rubber with different colors was used as pavement. (Source: provided by Luis Bravo)

1.3 Culture, memory and personal value

For local elderly, this refurbishing project is not only a place to use and live, but also a monument of their memories, a symbol of their culture, representing their own experience and value. The respects and maintenance of existed building and landscape help to create the most important emotional connections and reflections for elderly.

As said before, architecture of Catalunya has its special characteristics of structure, form and technique, which are rooted deeply in local natural environment. Architecture and surrounding landscape together create the unique cultural and esthetic images of Catalunya. For local elderly, they dwell in this accustomed environment from when they were young. It represents their own identities and memories, making them feel safe, natural and free.

In this project, the existed old school as well as its surrounding landscape just carried all local characteristics. In the refurbishment, this small and ordinary local space has become an emotional connection between now and past. It presented images of culture, memories and value of this village and passed them to contemporary architecture. Contemporary refurbishing provides a more convenient, comfortable, healthier and safer living space for the elderly, while the respect and maintenance of local and historical characteristics create familiar and intimacy feelings, evoking the deepest yearning for passed life, for culture and for their own value. Just like they said: “I want to live there, to go back to my familiar school.”

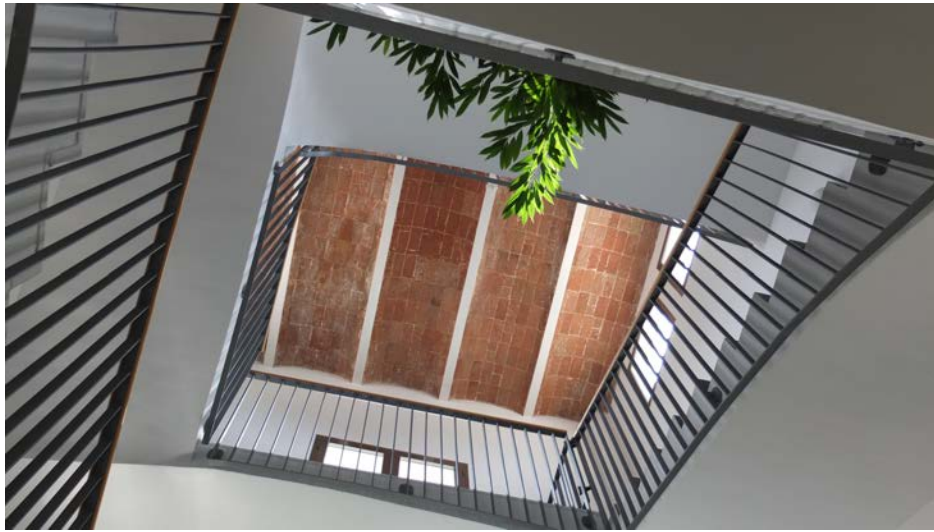


Figure 6.20: Historical brick arches were maintained. (Source: provided by Luis Bravo)



Figure 6.21: Historical brick arches were maintained. New division walls were designed in form of arch to correspond to the historical characteristics. (Source: provided by Luis Bravo)



Figure 6.22: Respect to historical and local characteristics has created deep emotional reflections in the refurbishing project. (Source: provided by Luis Bravo)

2. Emotional design study in the contemporary refurbishment of elderly Center of Beijing

The refurbishment of elderly housing in Beijing is a joint practice project between Universitat Politècnica de Catalunya and Tsinghua University of China. The project had a site located in Beijing historical center. Students majored in architecture from the two universities developed their concepts based on the same site. This joint project has an objective of investigating how to make contemporary refurbishing organically and improve life qualities for the elderly without destroying cultural characteristics and texture of historical cities in background of Chinese society, and also to see how to apply and transform European experience in Chinese project with adaption to special requirements of Chinese elderly, especially emotional requirements for living space.

The director of this project has made description of this joint practice:

“This project wants to put emphasis on that architecture is not only limited to solving a problem more or less complex, but actually Architecture proposes scenarios for the existence of people and weaving town.

The definition of these scenarios, especially the interiors of buildings for public use and the links between them, will enable vital uses related to more or less extensive programs and the dialogue with the context. It is proposed that the exercise contains elements that enrich the students itself possible projective processes.

It is a home for elderly people with a capacity for 50 people, 15 of which need special attention. The bedrooms are individual and each has its own bathroom except for special attention that can share it. There are some common areas such as living room and reading room, day activities, conference room and gym can make use of other persons not resident in the city center.

The building also contains a space for trade, which contains a restaurant, public baths, which will facilitate greater interaction with the public space of the city.

The program of the building project is a center for the elderly with a public commercial area. It is a kind of much needed equipment in China for the immediate future, due to the social change that is gaining population” (Joan Curos, 2015)¹⁰⁰

In this project, two adjacent sites could be chosen by student to developed their own proposals. These two sites are both situated in old Beijing center, beside Shichahai Lake where exists rich natural landscapes. This area has complex city textures integrating characteristics of history, natural landscape, traffic and commercial, which always generate influences to the life of local elderly. As said in the former study of Chinese culture identities, old Beijing center is one of the most representative and typical places of China. The strong characteristics of Chinese culture, history, memories, tradition are all integrated into unique city and architecture images: Hutong and Siheyuan. These special images represent the most typical and basic life style and dwelling characteristics of local people. Besides the cultural and historical factors, modern developments of Beijing city during the last years, as modern rehabilitations of traditional space, constructions of new buildings, streets and facilities, introductions of commercial functions and traffic, have created a more complex and integral texture to this area.

“The area is delimited by two distinct uses of the streets, the street that borders the site Xi Xi Yan Hai, is currently for traffic but has domestic dimensions and is used to walk around the lake. In contrast to the other side Xin Jie Kou Street Bei Da Jie is a fast track and enclosed by large shopping areas and individual shops. Is a basic part of the project, the public space and the permeability between this building and the ad- joining urban environment so necessary at this site. It should be noted as a very important aspect of project is this space that will generate the position of the building or buildings, being very attentive on pre-existing

¹⁰⁰ Joan Curos, 2015. 5 Propostes Centre per a la gent gran a Beijing. Universitat Politècnica de Catalunya. Escola Tècnica Superior d'Arquitectura del Vallès -Departament de Projectes Arquitectònics, TAP PTEf

geometry of the urban environment. Also keep in mind certain features such as the treatment of trees, natural light and sound, its quality and quantity.” (Joan Curos, 2015)

This project of elderly center needed both residence and commercial functions to provide basic life supports for the elderly depending on Chinese situations. The area of residence for the elderly is 2.148 m² and the commercial area is 1.020 m², a total of 3.168 m² building.



Figure 6.23: Typical Beijing image of Hutong and Siheyuan, which shows strong characteristics of Chinese culture identities. (Source: Composition by author.)



Figure 6.24: Two adjacent sites, which are situated in old Beijing center beside Shishahai lake. (Source: Joan Curos, 2015. *5 Propostes Centre per a la gent gran a Beijing*. Universitat Politècnica de Catalunya. Escola Tècnica Superior d'Arquitectura del Vallès -Departament de Projectes Arquitectònics, TAP PTEf.)



Figure 6.25: Images of the area. This area has complex city textures integrating characteristics of history, natural landscape, traffic and commercial, which always generate influences to the dwelling activities of local elderly. (Source: Joan Curos, 2015. *5 Propostes Centre per a la gent gran a Beijing*. Universitat Politècnica de Catalunya. Escola Tècnica Superior d'Arquitectura del Vallès -Departament de Projectes Arquitectònics, TAP PTEf.)

In the proposal of Anna Batallé Garcia, two factors were prioritized in the design: user comfort and respect to the existing features of the site. As said before, Chinese elderly always have deep emotion and insists of family value. They are rooted in their familiar living environment with their family, which gives them the much sense of safe, natural and free. It is their dwelling ways that originate and root deeply in Chinese culture, history and perceptions. These factors result in the special Chinese aging situations that aging in place will be the main pattern in the future. With this emotional requirements, contemporary refurbishment tried to provide a more comfortable, convenient and healthier life, but has to always develop based on full respects to the characteristics of their original living environment and life style, creating better life qualities without destroying their fundamental desires and identities for living space.

In this proposal, architecture was designed in forms adapted to the local features of intimacy scales, distributions of courtyard and appearance with slip roofs. It intended to integrate into the whole environment and look for a harmony and inheritance of local identities, which brought emotional reflections to the local elderly, meeting their emotional needs for home.

“The design is based on a housing unit that meets the needs of the elderly and recognises the structure and organisation of the local urban fabric of hutongs, with low buildings grouped around courtyards.” said the architect.

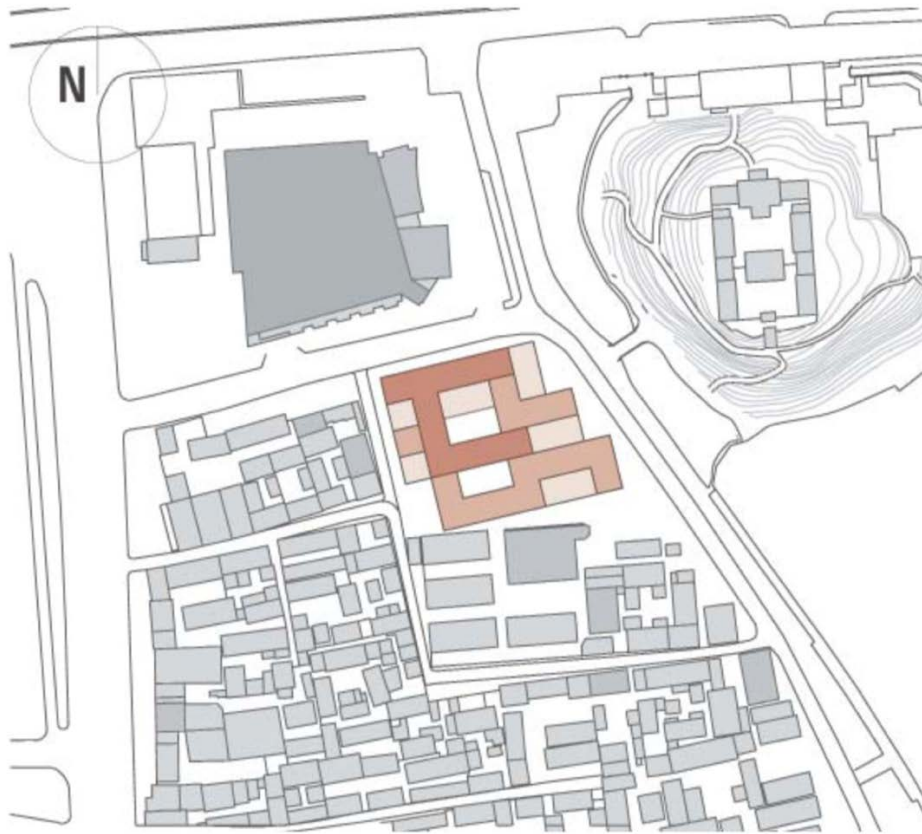


Figure 6.26: Masterplan of the proposal. (Source: Joan Curos, 2015. *5 Propostes Centre per a la gent gran a Beijing*. Universitat Politècnica de Catalunya. Escola Tècnica Superior d'Arquitectura del Vallès - Departament de Projectes Arquitectònics, TAP PTEf.)

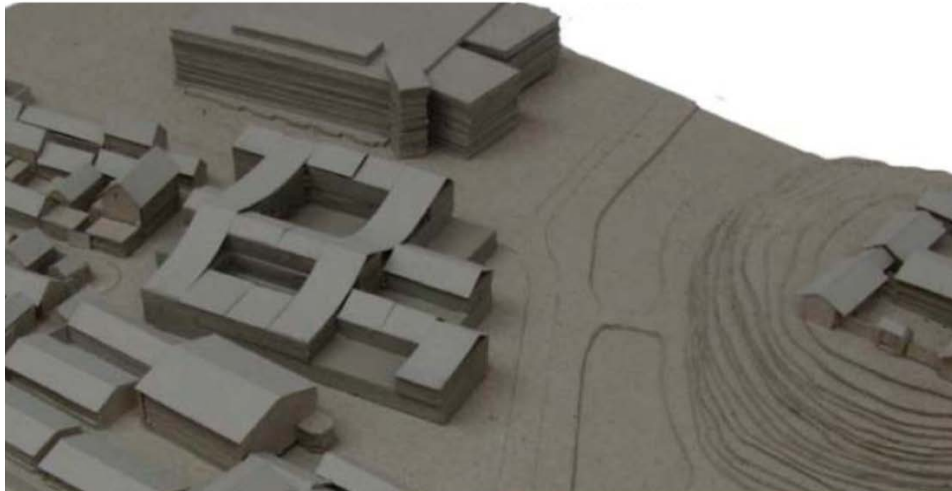


Figure 6.27: Model of the proposal. Architecture was designed in forms adapted to the local features of intimacy scales, distributions of yard and appearance with slip roofs. It intended to integrate into the whole environment, looking for a harmony and inheritance of local identities. (Source: Joan Curos, 2015. *5 Propostes Centre per a la gent gran a Beijing*. Universitat Politècnica de Catalunya. Escola Tècnica Superior d'Arquitectura del Vallès -Departament de Projectes Arquitectònics, TAP PTEf.)

In aspect of functions, elderly people's need as well as social conditions were fully considered. Besides accessible facilities, all rooms were designed with sustainable concepts, creating space where the elderly enjoy good sunshine and ventilations. Yard with trees had introduced the surrounding landscape into architectural space, providing a more natural and pleasure environment, where elderly can stay and do activities.

“To achieve sustainability, all the rooms have good sunlight, ventilation and a north-south orientation. Even the auditorium located in the basement has cross ventilation thanks to its contact with the existing courtyard. In the construction, thermal bridges were minimized and good acoustic and thermal insulation was provided. Sunlight is controlled by shutters and light by curtains.”

As required in the program, commercial service and shopping area were necessary to support the daily needs of the elderly as well as the whole communities. In this proposal, commercial functions were distributed without troubling residents' daily life.

“These commercial areas were faced to the lake and the street Xi Hai Xi Yan, which are the busiest areas. The more private area bordering on the hutong was used for the residence. A lounge area was created in front of the shops, cushioned by a green area between the facility and the street. A secondary road serves the entrance to the residence.” “In summary, the distribution of uses influenced the creation of the form of the building to ensure a successful integration of the scheme in its environment. The design and construction of the spaces provide comfort for the elderly users.”¹⁰¹

¹⁰¹ Descriptions by architect. Reference from: Joan Curos, 2015. 5 Propostes Centre per a la gent gran a Beijing. Universitat Politècnica de Catalunya. Escola Tècnica Superior d'Arquitectura del Vallès - Departament de Projectes Arquitectònics, TAP PTEf.

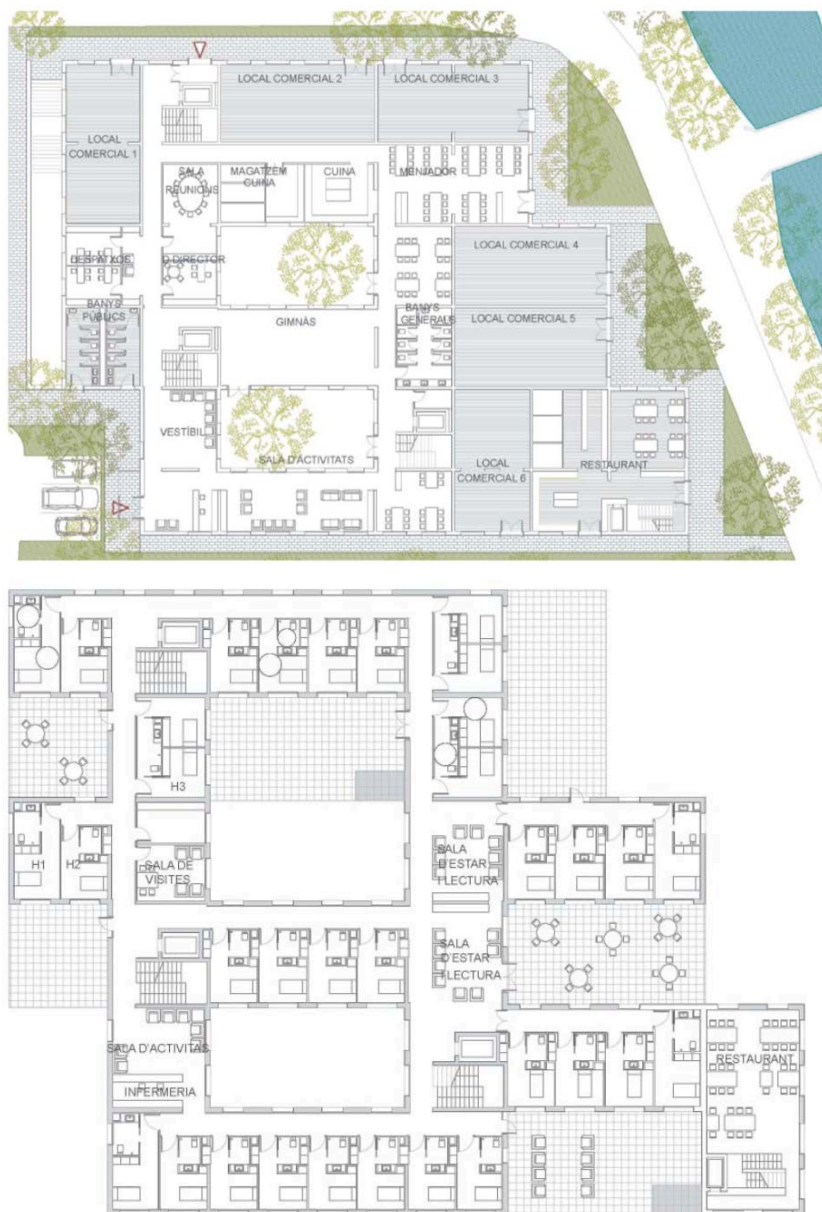


Figure 6.28: Plan of first floor. Figure 6.29: Second floor (Source: Joan Curos, 2015. *5 Propostes Centre per a la gent gran a Beijing*. Universitat Politècnica de Catalunya. Escola Tècnica Superior d'Arquitectura del Vallès -Departament de Projectes Arquitectònics, TAP PTEf.)



Figure 6.30: Facades. Architecture appearance inherited traditional features of intimacy scales, slip roofs and courtyards. (Source: Joan Curos, 2015. *5 Propostes Centre per a la gent gran a Beijing*. Universitat Politècnica de Catalunya. Escola Tècnica Superior d'Arquitectura del Vallès -Departament de Projectes Arquitectònics, TAP PTEf.)



Figure 6.31: Facades. Concept of space, always trying to connect to the nature. (Source: Joan Curos, 2015. *5 Propostes Centre per a la gent gran a Beijing*. Universitat Politècnica de Catalunya. Escola Tècnica Superior d'Arquitectura del Vallès -Departament de Projectes Arquitectònics, TAP PTEf.)

Compared, the proposal of Alex Ruiz Gabiña also showed great respect to local culture and features. Apart from urban fabric and architecture forms, he has concentrated more on the inheritance of local life style and social interactions.

Based on the former theories, architecture is originated and has its form with presence from the desire of human. Human's needs make architecture as well as city have meanings and develop in ways that benefit human and society. Living space, based on Heidegger's theory, has its presence because of human's desire of dwelling. Dwelling is the way we are, reflecting our own identities. Different culture, history, cognitions, perceptions and value affect life styles and social interactions, which are finally presented by the different shapes of living space. Contemporary living space has its presence and meaning when it shows the unique dwelling desire and identities of a society.

In this proposal, architect just intended introduced these essences to the space, making the elderly to feel the presence and their own identities of the space. It is a necessary way to generate emotional resonance and reflections for the elderly. As he said:

“The initial aim of the project was to understand and investigate the way of life and social interaction of elderly people in China. The site is one of the many neighborhoods of Beijing composed of hutongs. The characteristic urban fabric provides a barcode for understanding how the residents live, interact and build.”

Based on this concept, the architect studied the features of life styles in Hutong. As said before, Hutong and Siheyuan were one of the most representative living models of Chinese culture identities, showing the common value of family, perceptions of social relationship and nature. Chinese people always attach a lot of importance to family. Siheyuan is a living model with good considerations on the organizations of public and private space, which meets Chinese people's need to live together with all families. It created a private family world separated from the outside society. In Siheyuan, spaces were graded divided around courtyards of different scales, creating orderly private and public spaces. Family members could have their independent space for living. A series of courtyards of different

scales provided possibilities to different family activities adapted to their life needs. These private family communities were connected by Hutongs and had opportunities to communicate and interact with the society. The orderly combinations between private and public formed the whole dwelling style of traditional Chinese society, presenting Chinese culture and perceptions.

In this proposal, architect tried to introduced this typical living “ecosystem” in contemporary architecture space, creating a familiar living environment where elderly could have sense of safe and have emotional reflections of culture identities.

“Major streets structure the circulation through the hutongs and provide access to the groups of low houses around a common courtyard, protected from the surrounding world in a small “ecosystem” of neighbors and friends. These features help us to design our building, which is very similar to those of the hutongs.

The residence has an area for public use which leads to the bedroom area. From here one can see the groups of bedrooms as if they were in a hutong. The bedrooms have bathrooms and between them there is an outer courtyard for exclusive use by the residents who share it. This creates the “ecosystem” mentioned above.”¹⁰²

¹⁰² Descriptions by architect. Reference from: Joan Curos, 2015. 5 Propostes Centre per a la gent gran a Beijing. Universitat Politècnica de Catalunya. Escola Tècnica Superior d'Arquitectura del Vallès - Departament de Projectes Arquitectònics, TAP PTEf.

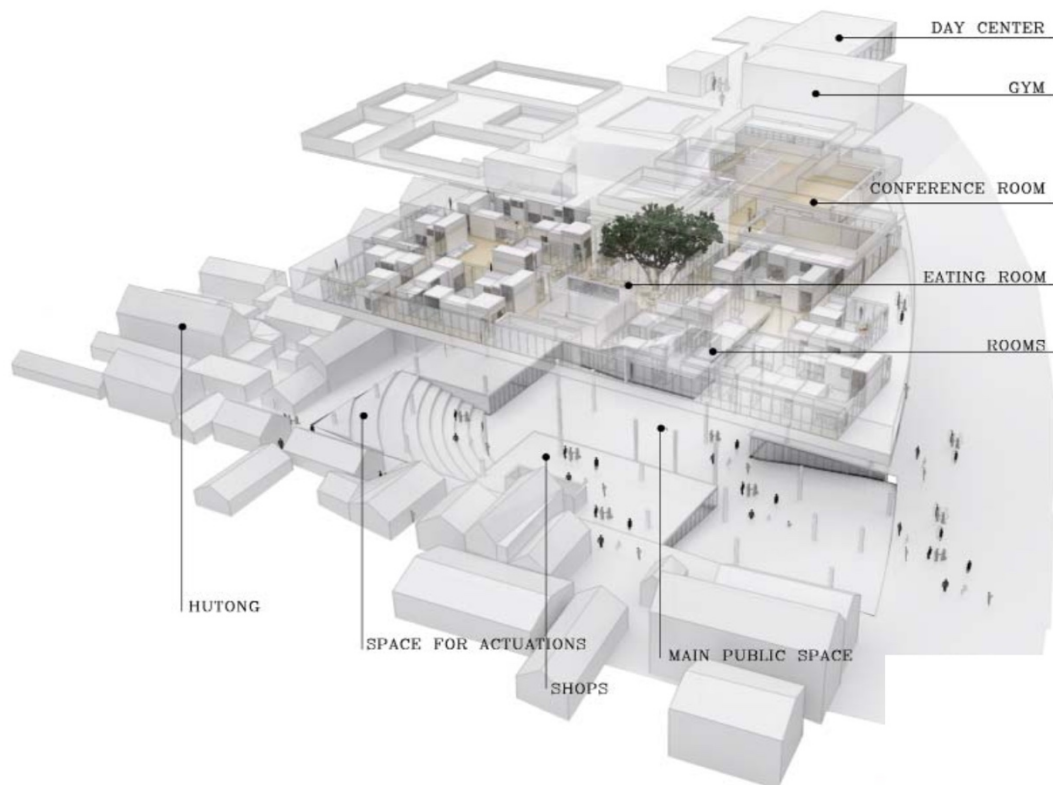


Figure 6.32: Concept of space. tried to introduced this typical living “ecosystem” in contemporary architecture space, creating a familiar living environment where elderly could have sense of safe and have emotional reflections of culture identities. (Source: Joan Curos, 2015. *5 Propostes Centre per a la gent gran a Beijing*. Universitat Politècnica de Catalunya. Escola Tècnica Superior d’Arquitectura del Vallès - Departament de Projectes Arquitectònics, TAP PTEf.)



Figure 6.33: Conceptual models of architecture. (Source: Joan Curos, 2015. *5 Propostes Centre per a la gent gran a Beijing*. Universitat Politècnica de Catalunya. Escola Tècnica Superior d'Arquitectura del Vallès - Departament de Projectes Arquitectònics, TAP PTEf.)



Figure 6.34: Plan. Figure 6.35: Section. Figure 6.36: Facade. (Source: Joan Curo, 2015. *5 Propostes Centre per a la gent gran a Beijing*. Universitat Politècnica de Catalunya. Escola Tècnica Superior d'Arquitectura del Vallès -Departament de Projectes Arquitectònics, TAP PTEf.)

This proposal concentrated on Chinese identities and special needs of Chinese elderly. In space creation, he paid attentions to the difference life habits between Chinese elderly and European. He tried to create comfortable healthy and pleasure using experience adapted to the special physical and emotional needs of Chinese elderly based on their own life styles and habits.

“Ultimately, Chinese culture is different to our own. Its more social nature forces us to consider that residents do not want bedrooms with large windows offering views so that they can sit alone while time passes. Social interaction, debate and mutual help are the characteristics of these elderly people, and were considered in the design. The residents will spend their time supporting each other, having fun, laughing and crying together with their friends.”

In the design of commercial areas, he also tried to create public shopping space without troubling the private life of residents. *“The brief also includes a large number of shops. This is why the residence is one floor up, resting on a large ‘tray’ that houses the installations necessary for the residence. It also forms a concave public space with shops, which can be used for activities such as markets, performances and concerts and connects to the lakeside path.”*¹⁰³

Refurbishing doesn’t mean to destroy, but to keep and develop the essences of culture and life with the contemporary process.

¹⁰³ Descriptions by architect. Reference from: Joan Curos, 2015. *5 Propostes Centre per a la gent gran a Beijing*. Universitat Politècnica de Catalunya. Escola Tècnica Superior d’Arquitectura del Vallès - Departament de Projectes Arquitectònics, TAP PTEf.

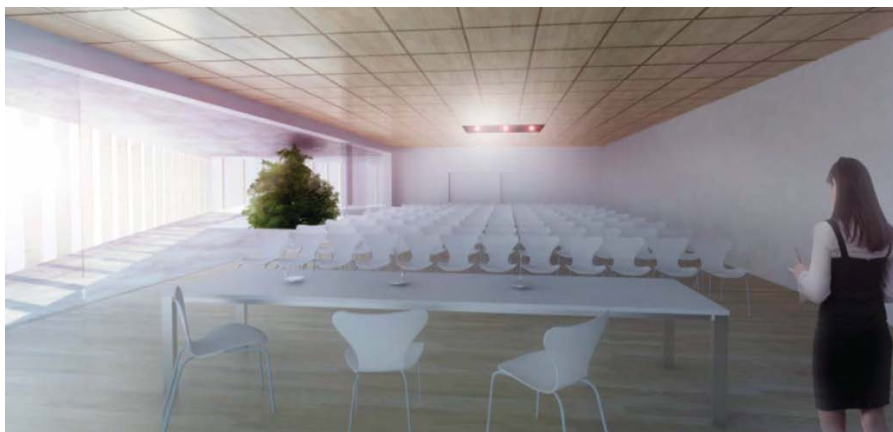


Figure 6.37 & 6.38 & 6.39: Conceptual rendering of the space. (Source: Joan Curos, 2015. *5 Propostes Centre per a la gent gran a Beijing*. Universitat Politècnica de Catalunya. Escola Tècnica Superior d'Arquitectura del Vallès -Departament de Projectes Arquitectònics, TAP PTEf.)

Chapter 7

Conclusion

1. General conclusion

This thesis is written under this background of Chinese society. China is suffering from the aging problem, both of growing aging population and elderly living space quality. Chinese contemporary elderly housing in the future should be thought as a way to solve effectively this social problem, providing a better life and healthy living environment for most elderly people. With the purpose of solving Chinese aging problem, this thesis tries to put forward new development direction and methodology for Chinese contemporary elderly housing design process adapted to the development of Chinese society. In this thesis, European experiences both in theoretical and practical field are studied as a guide to help find what the true requirements and essence of Chinese contemporary elderly housing are and how to develop in architectural ways.

New development directions of contemporary elderly housing facing Chinese aging problems

In the study process, this thesis has its fundamental philosophy thoughts of Phenomenology, believing that architecture is a product and is affected by the development of human and their society (Lefebvre, 1991). Architecture originates its form and develops from the first desires of human. Architecture has its presence and meaning when it shows effective and positive interactions with human and social needs, making people feel and experience the emotional expressions contained in architecture space and creating satisfactions to their

desires. In scale of societies, architecture has reflected and been always adapted to the common requirements and desires of the society in its developing period, including both material and immaterial aspects as culture, art, history, philosophy, economy, politics and technology. On this point, the nature of architecture design is to express the desires, related to feelings, and the need for translating all mental images of inspiration into reality. (Noelia Galván Desvaux and Antonio Álvaro Tordesillas, 2017)

Architecture phenomenon in China now is experiencing big revolutions. During the last decades, China has formed its special architecture and urban images, which are mainly linked to the strong desires of material and economic developments. The strong expectation has made architecture and urban development more concentrate on the effective functions and economic benefits, ignoring other spiritual hopes and needs of culture, art, history, aesthetics and other humanity aspects. Today, because of the influence of global contemporary developing process, Chinese people and society are suffering a lot from the cold and pure industrial architectural images, which lack emotional and humanistic care. Chinese architecture as well as the society requires a more humanistic direction to satisfy human's common hope in spiritual aspects. These changes have forced architecture more focusd on feelings and emotional touches of space, providing places where people can feel the humanistic cares, where people can live with more pleasure and spiritual satisfactions. Based on these backgrounds, emotional design in Chinese contemporary architecture is a necessity decided by both the nature of architecture and the social developing states of China. It is a way to make architecture have its presence and meaning as well as a common hope of contemporary Chinese society.

Compared with other ages, the elderly is thought as a group which needs more humanistic care especially on their emotional requirements. Living space for the elderly should be more treated as a way to show the humanistic care of society, providing contemporary life styles with high qualities and rich spiritual satisfactions. Apart from physical health, mental health, which links to their feelings and experience of living space, should be emphasized. Emotional design in Chinese contemporary elderly housing is a development direction facing to the

hope and requirements for living space of elderly group. And it is also a necessary way to create presence and meaning for elderly living space adapted to the contemporary process of Chinese architecture and society. On the other hand, living space for the elderly should also meet the growing aging population. Sufficient elderly housing with high qualities should be provided. In these years, Chinese government has tried to develop new elderly residence areas. But the high costs and long distance from city have both demonstrated that new elderly residence area is not an effective solution to meet the space needs of the huge aging population. Furthermore, for the influence of Chinese culture and traditional thoughts, Chinese elderly people consider family as a great value. Most Chinese elderly don't want to leave their familiar space. For these reasons, aging in place is still the most suitable and main pattern for the Chinese elderly in future, which is confirmed by current aging situation studies¹⁰⁴ and new policies. Instead of developing new residence areas, refurbishing of the original living space will be a necessary direction that could meet the requirements of space with high qualities for the growing aging population.

According to these studies, Chinese contemporary elderly housing development in the future should combine emotional design with architecture refurbishing, creating new life styles with both material and spiritual satisfactions. Emotional design in elderly housing refurbishing is focused on the experience and feeling of space, aiming to renew the space with contemporary meanings and meanings adapted to the new hopes of the Chinese elderly in the development process. It doesn't only mean to improve life qualities in the physical level, but also to create a mental-health environment to provide high-level spiritual satisfactions for the elderly through living space.

¹⁰⁴ Wu, Yushao, vice president of Chinese Aging Association, said in his report in the forum for aging industry of Tsinghua University in 2017, that now China is forming a "9802" aging model instead of "9073". 98% of the elderly live at home and only 2% elderly live in nursing home.

Methodology of emotional design in Chinese contemporary elderly housing

Around this core developing direction, European experience has a great value for the explorations of emotional design methodology in Chinese contemporary elderly housing refurbishing process. In Europe, with the development of Phenomenology concepts, the emotional design approach study has already achieved great results both in theory and practice. This thesis mainly studies Norman's emotional design theory to see the possible interactions and the involving process between products and human's emotions. Norman has put forward three levels involving human's emotion: visceral, behavioral, and reflective, which can be mapped to produce characteristics of appearance, using experience and personal satisfaction of memories, culture and values. Emotional design could be realized from these three levels to generate comprehensive effects of different degrees. On the other hand, emotional design has been studied and practiced by contemporary architects as Asplund, Luis Kahn, and Peter Zumthor. Focusing on space feeling and experience, they tried to create a space with high spiritual satisfactions, showing the nature and presence of the space to the world.

Coming back to elderly living space, emotional design of Chinese elderly housing refurbishing provides spiritual satisfactions adapted to the hopes and emotional needs of the Chinese elderly for living space. But what are their hopes and emotional needs in detail? In this thesis, this question is a basis of the methodological explorations of emotional design of Chinese elderly housing refurbishing. On this part, this thesis has introduced the philosophical thought of Heidegger, which was also developed based on the phenomenology concepts, to find the nature and human's desire for living space. According to Heidegger's thoughts, living space originates from human's desire for dwelling. Dwelling shows the way we are (Heidegger, 1951, p2), reflecting the unique identities of human associated with their thoughts, cognition, cultural background, preference, and experience. At the same time, dwelling activities always show common and fundamental desires of being protected and free. "To dwell, to be set at peace, means to remain at peace within the free sphere that safeguards each thing in its nature. The fundamental character of dwelling is this sparing and preserving" (Heidegger, 1951, p3). As a result, contemporary living space for the Chinese elderly needs to express the unique identities of Chinese society as well as provide

the sense of safety and freedom.

Based on these desires and emotional requirements of Chinese elderly for contemporary living space, this thesis has introduced Norman's emotional design methodology to architecture field, trying to make a systematic analysis of the possible involvements between architectural elements and the elderly's emotion and to explore all the possible ways to realize the emotional design in Chinese contemporary elderly housing. Corresponding to the three levels, architecture could interact with the elderly's emotion from three aspects of architectural appearance, functions and utility, and emotional reflections of culture, memory, aesthetics and personal value. In this study process, European cases are helpful to analyze the possible methods in detail corresponding to each architectural aspect. European countries had also suffered from aging problems and had achieved results which could help to solve Chinese problems. This thesis has summarized the former experience and methods of emotional design in elderly housing especially refurbishing cases based on the mentioned three levels, trying to form a comprehensive emotional design system and general methodology which could be applied in future Chinese cases.

Particular focus of emotional design in Chinese contemporary elderly housing refurbishing

The methodology of emotional design in Chinese contemporary elderly housing has its commonality with European cases. However, it still has its particular focus which is always associated with the special emotional need of identities for living space. As said before, living spaces present different shapes with the change of identities. Living space always needs to express the emotional desire of what we are, showing our own particular identities of the society. Comparing China with Europe, because of the big difference of culture, the methodology of emotional design in Chinese contemporary elderly housing should have its particularities. With the big influence of Chinese culture, China has formed its special thoughts, esthetic perceptions and philosophy which are reflected through as well as affect the traditional art and architecture in all aspects as forms, materials, distributions and colors. These culture identities, which are the essence of Chinese society and are rooted deeply in Chinese people's mind, could generate the greatest emotional

resonance for Chinese people. The inheritance of Chinese culture identity is a necessary and particular focus of Chinese contemporary elderly housing. By analyzing the contemporary case of Wang Shu, the research wants to emphasize that the inheritance of Chinese culture doesn't mean to copy traditional elements or forms. Instead, it needs to understand the spiritual meanings of the space and re-present them in a contemporary way. Inheritance of Chinese culture identity in elderly housing should be realized with understanding and respect to the original life styles, traditions, memories and experience contained in architecture space and urban fabric. Chinese contemporary elderly housing refurbishing is not to destroy, but to renew and integrate the essence of Chinese life in our present time .

2. Limitations

During the study process, former investigations, architecture cases and philosophy theory have provided evidence and information to support the realization of this research. But there are still some limitations.

Firstly, this research has a background of Chinese society. The study results used in this thesis are always based on the general situations of China. Although China has its common characteristics, the complex compositions make different Chinese areas have their particularities in culture and traditions, as well as in the development situations of economy, policies, economic conditions and strategy. These factors may lead to the difference of architecture requirements. On the one hand, as said before, architecture is a product of social desire and requirements, which reflects and is affected much by the social economy, policies, economic conditions and strategy. The unbalance of development situations of China may affect the develop directions and focus. For example, in some undeveloped villages in China, the elderly have to live alone because their sons need to leave home for work. And low economic conditions couldn't support the contemporary

refurbishing or providing sufficient nursing service for every home. In this situation, aging in public nursing home may be a better choice which reduces both economic and service pressure adapted to the special development conditions. On the other hand, culture of different areas also has diversity. Inheritance of culture identities should respect the particularity of each area. This research mainly aims to put forward a general direction and design system for Chinese elderly housing according to the common phenomenon and problem of Chinese society. Particularity of special areas should be considered in future projects.

Secondly, to analyze the possible methods of emotional design in contemporary elderly housing, this research has chosen representative cases from Europe and China. The study results are found based on the feelings and experience of the specific users, which may lead to differences related to cultural contexts, habits and requirements. Different users may have different feelings of the same space, which may be against the research results. For example, the application of high-tech and smart home could bring convenience and better using experience for most elderly. However, there are specific groups with allergy to internet signal. With this limitation, the particularities of space user should be considered in each project. Suitable and specific methods should be carefully chosen from all these possible ways to create an emotional space associated with the special needs of its user.

Finally, this research has gotten theoretical concepts and methodology for emotional design in Chinese contemporary elderly refurbishing based on the investigations of Chinese current situations and European elderly housing design experience. However, these results are still expected to be further practiced and studied in future projects. As said before, every architectural project has its particularity related to its user, region, history, and other cultural contexts. How to combine the theoretical concepts and methodological models with different Chinese elderly housing projects still needs further explorations.

3. Future researches

This thesis has emphasized the presence and the social meanings of architecture. Architecture, as a product of social desire, always reflects and is affected by the social development conditions and requirements. Chinese architecture as well as the society is experiencing the big revolution. The focus is changing to a more humanistic-concerned field. With this change, Chinese contemporary architecture would be more complex with emphasis on its spiritual and humanistic meanings. Contemporary architecture will not be only treated as a functional object with material and economic benefits, but also a place to feel and experience humanistic-concerns, providing satisfactions to the emotional hopes of better life with both material and rich spiritual enjoyments. With this purpose, contemporary architecture will be developed in a more interdisciplinary and integral way combining art, culture and technology to create better and comprehensive emotional experience in architecture space. With this concept, some desired avenues for future research would therefore be continued with a more interdisciplinary methodology.

Firstly, new interdisciplinary emotional methods will be studied based on the emotional interaction between the elderly and space elements. Emotional involvements are complex systems related to many factors. The future research will continue to concentrate on the relations among the elderly's perception, emotion and space, to find those new factors that may improve the elderly's feelings in common levels as well as specific cultural contexts of China.

On this part, specific researches will be realized in art field. Architecture is always integrated with art to generate specific emotional touches in emotional design process. Artistic methods, as sound art, have been studied and applied in health-care field to cure health problems. New studies have found that sound could

provide stimulation to cure the Alzheimer problems.¹⁰⁵ Dr. Josep Cerda, an expert of sound art, continued his research on the effects of new sound art on the elderly's healthy problems, which would be helpful for emotional design of future elderly housing. In the future research, more cooperation with specific artists are expected to be realized to find new artistic methods to help create a healthier and more humanistic living environment for the elderly.

Secondly, new technologies would be investigated to provide a better elderly housing using experience of contemporary elderly housing. With the development of high-tech and smart home, artificial intelligence has become a hot topic. More and more AI products are used to provide daily assistance and nursing service for the elderly's life. How to combine the advanced technology with emotional design and how to choose the suitable technological products adapted to the conditions of space users will be always studied in the future research.

Thirdly, in emotional design concept, emotional reflections are treated as the highest level to create involvements and mental satisfactions. As mentioned in the research, contemporary elderly housing refurbishing emphasizes the inheritance of Chinese cultural identities and memories to create deep emotional reflections and satisfactions for the elderly. However, this concept is not limited to elderly housing field. As China is experiencing big revolutions of architecture thoughts and society, contemporary spaces, regardless of the types, are expected with more humanistic contexts and identities of culture, art, history, traditions and memories. With this purpose, emotional design should be always thought as a necessity. Today, most Chinese cities are facing refurbishing problems to adapt to the contemporary requirements. In the past years, for economic reasons, city refurbishing was always realized by destroying all old cities and reconstructing new ones. The rude ways got economic benefits but lost a lot of cultural, historical and memory contexts. Inheritance of the essences of Chinese culture and space identities have suffered from the big risk. In the future, with the revolution of

¹⁰⁵ Kamal Sabran, Norfadilah Kamaruddin, Ismail Lasa, Norfarizah Mohd Bakhir. "A Study on Applicability of Sound Art as Therapy for Alzheimer's Patients." *Advances in Economics, Business and Management Research (AEBMR)*, volume 41.4th Bandung Creative Movement International Conference on Creative Industries 2017 (BCM 2017)

thoughts, city refurbishing must change to a more humanistic way with respect to cultural identities and spiritual essence of life and space to generate emotional reflections and resonance for Chinese society. The future research will extend emotional design concepts and methodology from elderly housing to whole urban space refurbishing in both theoretical and practical fields, to inherit and develop the essence of Chinese culture and space in contemporary era.

4. Contributions

The main objective of this research is to put forward new directions and systematic methodology for the development of Chinese contemporary elderly housing as well as solve Chinese aging problems. With this intention, the research has indicated a more humanistic-concerned way with specific focus on emotional design and refurbishing. During the study, philosophical acknowledges of Phenomenology have been applied in Chinese society to find what the nature of architecture is and what the real requirements of elderly housing are, adapted to the developing situations of China. These efforts aim to provide evidence and theoretical supports to develop Chinese elderly housing as well as all architecture thoughts in a more humanistic and meaningful direction. Today, as we said before, Chinese architecture as well as urban refurbishing, always focuses on the economic and political levels, ignoring the emotional feelings and spiritual contexts of culture, art, history and memories. The main contribution of this research is mainly to promote the revolution of thinking, to attach importance to the social emotional requirement and its significance for architecture design, to provide better and meaningful spaces with sufficient satisfactions in physical and mental levels and finally to improve the life qualities of the elderly as well as the overall Chinese society.

With this main objective, this research has tried to analyze and integrate

emotional design methods in a complete system. This research has introduced Donald Norman's emotional theories into architectural field to find all the possible interactions and involvements of different levels between emotion and space. The research is expected to form a systematic emotional design methodology for the elderly based on the analysis of their requirements for living space. This methodology of emotional design may make effective suggestions for contemporary architects of elderly housing as well as other type of architectural projects, to create humanistic-concerned spaces with better experience and feelings.

In the study process, the research also emphasizes the particularity of Chinese elderly housing design compared with Europe. In China, there is the problem of architects always copying foreign architectural forms but ignoring the particularity of Chinese cultural context. Highlighting the inheritance of Chinese cultural identities, this research analyzes the main cultural contexts of China and indicates their significance, especially in the emotional level. The particularities of cultural context aspects worth special attention by all Chinese contemporary architects. This research is making an effort to emphasize the importance of cultural identities in architectural space, with big expectations of inheriting, developing and integrating the essence of Chinese culture in our present time.

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